...NOLOGY DEPT.

A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

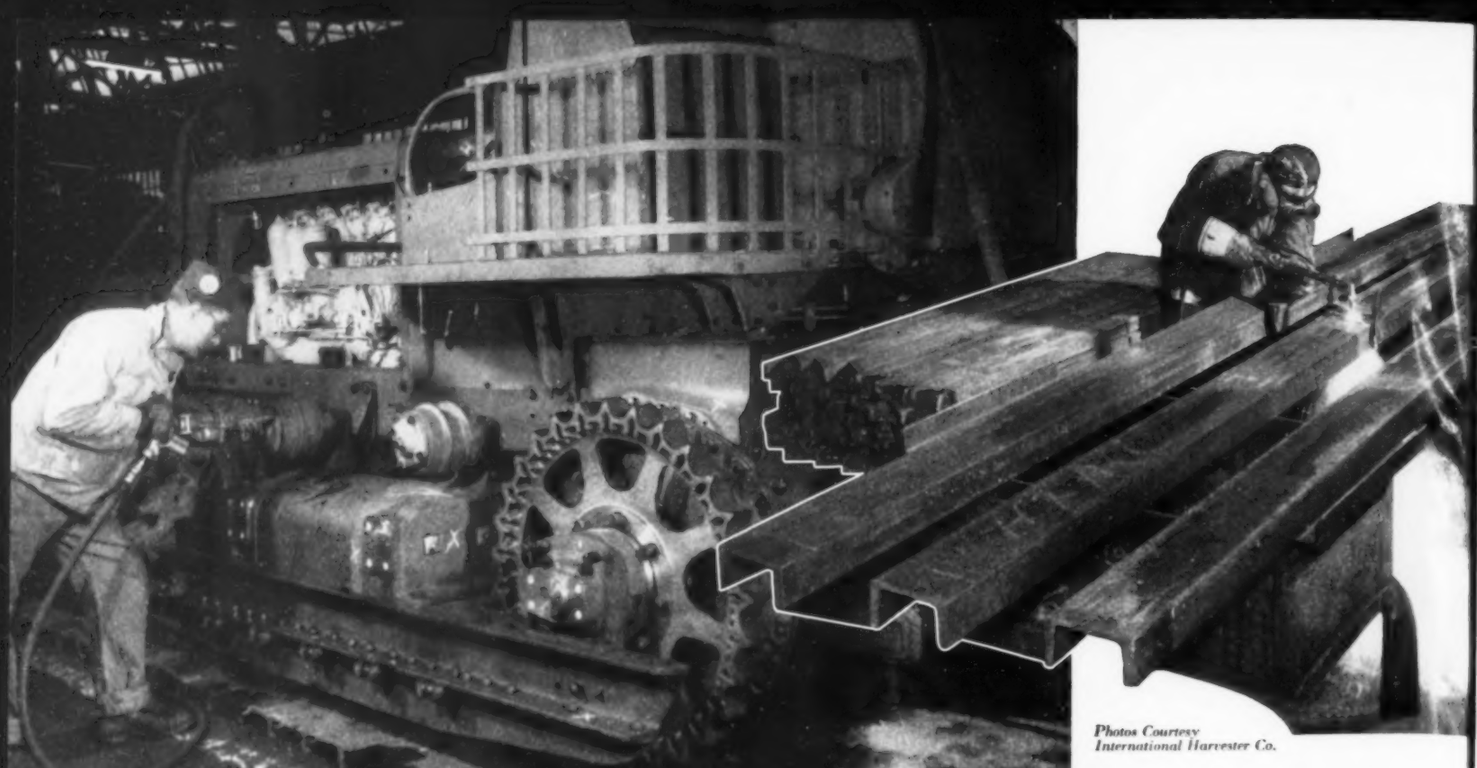
Construction Methods

...PUBLIC LIBRARY
JUN 17 1944
DETROIT

McGRAW-HILL PUBLISHING COMPANY, INC. • PRICE 20 CENTS

BUY ONE OF THESE BONDS - *TODAY*

JUNE, 1944



Photos Courtesy International Harvester Co.

Frames of track type tractors must resist terrific bending and twisting stresses.

Stronger Backbones for Tractors Using Inland Hi-Steel

Tractor frames must be strong—particularly those for track type tractors, which are turned by stopping one track, throwing terrific bending and twisting stresses onto the frame. That is why a manufacturer of tractors chose Inland Hi-Steel for the frames of their 10-ton track type Diesel tractors; Hi-Steel offers higher strength without added weight or size.

The original tractor design called for steel with 44,000 lb. per sq. in. yield strength. For the grueling service to which these tractors are subjected, especially when a bulldozer is mounted directly on the frame, it was found that greater strength was needed. Increasing the size of the frame section would have entailed complete redesign and sacrificing many desirable tractor features.

Inland Hi-Steel offered the perfect solution to the problem. Replacing the carbon steel channels with Hi-Steel, which has a yield strength of 57,000 lb. per sq. in., made possible retaining the same size and weight of frame, while increasing strength 29.5%. All design features were retained, and adopting Hi-Steel called for no change in fabricating methods. Thousands of these sturdy, powerful tractors in service confirm the dependability of the Hi-Steel frames.

Inland Hi-Steel, the corrosion-resistant and high-strength, low alloy, has established records for service and endurance on many of the toughest peacetime and wartime jobs. Today, most of the Inland Hi-Steel goes into war jobs but when peace comes, it will again be available for the construction of equipment in which higher strength, reduced weight and greater corrosion resistance are factors in product design, sale and service.

INLAND STEEL COMPANY

38 S. Dearborn St., Chicago 3, Ill.

Sales Offices: Cincinnati • Detroit • Kansas City • Milwaukee • New York • St. Louis • St. Paul

CURRENT JOBS
. . . and Who's Doing Them

BUILDINGS

Public—Army contract for $17,000,000 plant addition at Baraboo, Wis., was awarded to **Mason & Hanger**, of New York, N. Y. Navy contract for magazine facilities at Seal Beach, Calif., went to **W. E. Kier Construction Co.** and **William Simpson Construction Co.**, of Los Angeles, for $3,218,077. **MacDonald & Kahn**, of San Francisco, Calif., has $2,631,000 Navy contract for increased facilities at Shoemaker. Another Navy contract for personnel buildings at Shoemaker was awarded to **Guy F. Atkinson Co.**, of San Francisco. **Goodenough & Geyer**, of Palo Alto, Calif., will build facilities for Navy at San Bruno for $1,536,667. **Howard S. Wright**, of Seattle, Wash., has $1,000,000 contract for plant at Bellingham, Wash.

Industrial—Manufacturing plant will be built for $8,000,000 by **Henry J. Kaiser Co.**, of Fontana, Calif. Power plant at Springdale, Pa., will be built by **Sanderson & Porter**, of New York, N. Y., for an estimated $6,000,000. **Foundation Co. of Canada, Ltd.**, of Montreal, has $2,550,000 contract for plant at St. Laurent, Que. Factory at Springfield, Ill., will be built by **Permanent Construction Co.**, of Chicago, for $2,500,000. Contract for $2,000,000 chemical plant at Columbia, Tenn., was awarded to **C. G. Kershaw Contracting Co.**, of Birmingham, Ala. Contract for buildings at Roanoke, Va., went to **Caristo Construction Corp.**, of Brooklyn, N. Y., for $1,557,500.

Commercial—Contract for 650 stucco dwellings at West Los Angeles, Calif., was awarded to **Del E. Webb Construction Co.**, of Los Angeles and Phoenix, Ariz., for $2,500,000. **S. Patti Construction Co., Inc.**, of Kansas City, Mo., will build 49 apartment buildings in Kansas City for $2,000,000. **Halper Construction Co.**, of Los Angeles, has $1,300,000 contract for 370 frame stucco dwellings at Inglewood.

HEAVY CONSTRUCTION

Aviation facilities for Navy at El Toro, Calif., will be built by **Del E. Webb Construction Co.**, of Phoenix, Ariz., for $2,502,880. **Casson & Ball**, of Hayward, Calif., submitted low bid of $2,253,129 for airport runway at San Diego. Navy contract for railroad section in state of Washington was awarded to **General Construction Co.**, of Seattle, for $1,889,043. Another Navy contract for quay wall at San Diego, Calif., went to **M. H. Golden Construction Co.**, of San Diego, for $1,810,825. Air station barracks at Alameda, Calif., will be built for Navy by **Stolte, Inc.**, of Oakland, for $1,423,000. Airport runways and buildings at Fort Nelson, B. C., will be constructed by **Tomlinson Construction Co., Ltd.**, of Toronto, Ont., for $1,250,000. Contract for Naval air station building at Alameda, Calif., was awarded to **G. W. Williams Co.**, of Burlingame, for $1,169,800.

HIGHWAYS

Among recent highway contract awards are the following: Illinois: $325,839 to **L. G. Arnold, Inc.**, of Eau Claire, Wis.; $268,277 to **W. J. Sheppard**, of Chicago; $280,451 to **Black Top Roads Co.**, of Chicago; and $289,909 to **Sangamo Construction Co.**, of Springfield. Kentucky: $192,919 to **White Consolidated, Inc.**, of Chicago, Ill. Maryland: $328,214 to **Robt. W. Cleveland & Co.**, of East Orange, N. J. Pennsylvania: $917,910 to **Union Building & Construction Corp.**, of Passaic, N. J.; $402,825 to **Jas. Julian**, of Wilmington, Del.; and $717,308 to **Buffalo Gravel Corp.**, of Camphill. South Carolina: $240,706 to **R. B. Tyler Co.**, of Louisville, Ky. Texas: $262,985 to **Public Construction Co.**, of Denton. Virginia: $281,206 to **W. H. Armstrong & Co.**, of Washington, D. C.; $1,062,835 to **Sam Finley, Inc.**, of Roanoke; $976,126 to **J. R. Ford Co., Inc.**, of Lynchburg; $233,021 to **F. D. Cline**, of Raleigh, N. C.; $481,220 to **Atlantic Bitulithic Co.**, of Washington, D. C.; $246,956 to **Ames & Webb, Inc.** and **P. H. McGuire, of Norfolk**; and $256,261 to **Arlington Asphalt Co.**, of Rosslyn.

Copyright, 1944 — Established 1919

McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York (18)

Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

JOHN ABBINK, Publisher

ROBERT K. TOMLIN, Editor — A. E. PAXTON, Manager

Editorial Staff: Vincent B. Smith, Paul Wooton (Washington)
N. A. Bowers (San Francisco) Nelle Fitzgerald
Patricia McGerr

JUNE, 1944

THE *How* OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **CHINESE LABORERS** built Army airfields —p. 49

How **WOOD POLE ERECTION** for 100-mi. transmission line was handled by tractor-crane rig —p. 52

How **FLIGHT HANGAR** was built of reinforced concrete to save critical materials —p. 56

How **ELECTRIC ARC-WELDING** has been applied to varied types of steel construction —p. 57

How **FLORIDA OVERSEAS HIGHWAY** was revamped to serve war traffic —p. 58

How **AIRCRAFT PLANT CONSTRUCTORS** whipped difficult conditions to meet fast schedule —p. 60

How **HEAVY CARRIER TRUSSES** made up of 18-in. I-section members were assembled in vertical position —p. 62

How **PRESTRESSED CONCRETE PIPE** was made by new method to save steel —p. 66

How **PREFABRICATED TIMBER BRIDGES** treated in Oregon were erected in Alaska —p. 67

How **AIRBASES IN CHINA** were built by native labor and primitive methods —p. 68

How **STATE HIGHWAY SYSTEM** should be maintained under wartime conditions —p. 72

How **PORTABLE HYDRAULIC RAM** was used to bend structural members of Liberty ship frame —p. 74

How **COMPRESSED AIR ROUTER** removed 1-in. joint filling material placed between powerhouse walls and columns —p. 75

How **ALL-METAL RAM** was used at shipyards to change keel blocks during painting of hulls —p. 75

How **STEEL GRATING** was installed on highway to test post-war possibilities —p. 82

McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK (18), N. Y.

JAMES H. McGRAW, Founder and Honorary Chairman

Editorial and Publishing Offices: 330 West 42nd St., New York (18); 520 North Michigan Ave., Chicago (11); 68 Post St., San Francisco (4); 738-9 Oliver Bldg., Pittsburgh; Aldwych House, London, W. C. 2, England. Branch Offices: Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Los Angeles; Atlanta, Ga.

JAMES H. McGRAW, JR., President — **HOWARD EHRLICH**, Executive Vice-President for Business Operations — **JOHN ABBINK**, Executive Vice-President for Editorial Operations

CURTIS W. McGRAW, Vice-President and Treasurer — **JOSEPH A. GERARDI**, Secretary — **J. E. BLACKBURN**, Circulation Manager

CONSTRUCTION METHODS, June, 1944. Volume 26. Number 6. Published Monthly, price 40 a copy. **Return Postage Guaranteed.** Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York (18), N. Y. **Subscription rates**—United States, Mexico and Central and South American countries, $1.00 a year, $1.50 for two years, $2.00 for three years. Canada, $1.50 a year, $2.50 for two years, $3.00 for three years. Great Britain and British Possessions, 12 shillings a year, 36 shillings for three years. All other countries, $2.00 a year, $6.00 for three years. Entered (as recentered) as second class matter December 16, 1936, at the Post Office of New York, N. Y., U. S. A., under the act of March 3rd, 1879. Printed in U. S. A. Cable address: "McGrawhill, New York." Member of A. B. P. Member of A. B. C. Contents copyrighted 1944 by McGraw-Hill

CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY
330 West 42nd Street, New York (18), N. Y.

Director of Circulation:

Please change my address on Construction Methods

From .....

.....

To .....

.....

THE COST OF
Tomorrow's Peace

Today peace-loving Americans are united with thirty-three other nations in a common objective of destruction.

Millions of our fine, young men and women find themselves invading foreign lands in order that their own shores may be spared, and their free way of life preserved.

Their sacrifices will be great. Their job will be well done.

But what of the job they will expect of us when they have finished theirs . . . the job of turning their hard-won victory into a lasting pattern of peace?

Can we come up to their great expectation? We must realize that this is the last opportunity of our generation. We must do a better job of it than we did in the Twenties and the Thirties.

We have our backs to the wall, and the scars of World War I and a thirteen-year depression still are upon us. The final test of our way of life is at hand!

As we look over our shoulder into the immediate past, we see little to encourage us. But we also see much to make us pause. We see a tremendous fighting machine, created in a matter of months by the miraculous organization of our resources.

We, the largest of the peace-loving nations, have overnight become masters at the business of waging war. Today, as a result of the coordination of industry, labor, and government, we are producing *for war alone* as much as our total normal production for peace.

* * *

We have amply demonstrated our ability to harness the vast productive capacity we possess. Why cannot these resources, which we have organized so efficiently for the destruction of life and property, be directed toward the destruction of the causes of war?

May not the patriotic and emotional strength and the unity of action which have been stimulated for the purpose of winning the war be directed, at least equally well, toward the attainment of world peace and international harmony?

If they are not so directed, what lies ahead but another war? And how can America, in a world that is so rapidly shrinking in size, avoid involvement in *any* of tomorrow's conflicts?

International peace is an ambitious dream and its price is high, but the price of war is even higher. Our world cannot long survive the periodic waste of its human and material resources.

Our country can be the most potent single force in bringing about the international understanding that leads to peace, in developing the unity that will make the most of the ample resources nature has provided everywhere.

* * *

There is no unity in selfishness. There can be no unity if any one of the great powers fails to do its part in determining and eliminating from the world the basic causes of aggression.

These basic causes stem from greed and the suppression of opportunity for individual progress; for self-preservation is the first law of nature.

Mussolini's dramatic march on Rome in 1922 was made possible by disillusioned veterans of World War I who could find no jobs and whose future held no promise. Some of Hitler's most determined followers came from the same ranks.

Men denied the opportunity to make a living, for themselves and for their children, are easy prey to false doctrines and dangerous "isms."

In any realistic appraisal of our domestic problems—economic, labor, racial—it is clear that we can solve them, not by waiting until we reach some utopian accord, but by making a series of compromises. We do this because we know how discord can impair the very roots of private enterprise, self-government, and self-discipline—the essentials of a dynamic democracy.

Similarly, peaceful reconstruction of our world economy depends on the ability of nations to reconcile their differences in a series of working agreements.

If we in the United States want lasting peace and if we want to preserve our democratic way of life, we must take over our full share of the task of initiating these compromise measures. Acknowledging our inescapable responsibility as the greatest economic and military power in the world, we must attempt to insure the free flow of world trade, and develop—with profit for both parties—backward areas abroad as well as at home. And we must do this by making all nations share the responsibility, not by allowing ourselves to be manoeuvered into being an international Santa Claus.

With our allies, we will have to see to it that the devastated portions of the world rehabilitate themselves as quickly as possible; that practicable and realistic trade and economic relations between nations are developed; and that the energies and productive capacities of these nations are set free to function in a climate that is favorable to the growth of free enterprise and individual initiative. As the most powerful economic force on earth, we have the most to gain and the most to lose at the peace table; and we must never forget that with our power comes responsibility.

We cannot hope to solve all of the problems of all nations—nor even all of our own—but our way can become the way for more of the world's humanity. Our strength can become the guiding spirit of the smaller nations.

* * *

In the development of a sound American foreign policy, let us take care not to attempt to control the destinies of other nations. Let us remember that we must set the example of self-determination of independent, free peoples.

Freedom is essential to international peace; and free competition—whether it be between individuals, between businesses, or between nations—is the mainspring, the synchronizer, and the preserver of freedom. For competition always is synonymous with private enterprise.

We are not a covetous nation. We have no territorial ambitions. Our international commercial aspirations are dominated by the conviction that we have a great stake in world unity and world prosperity. We know that we can no longer live apart from other nations and that we cannot ignore the fundamental elements which affect the well-being of other countries.

Our foreign policy must encompass a world of trade, and help develop it.

We dare not blunder in the execution of that foreign policy if the American way of life is to survive. A democracy resolved upon isolation is doomed in the world of tomorrow.

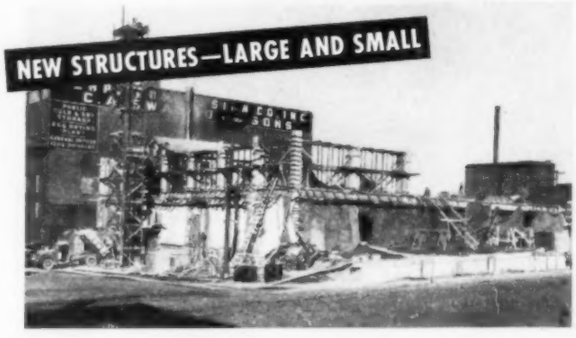
Let us resolve that out of this devastating catastrophe we shall emerge with fuller understanding and greater determination to build the kind of world which can materialize only if this country has the vision and the will to see it through.

We still are free to decide our own fate—still free to shape our own future. We still are free to preserve the liberty and happiness that has made our country the hope of the world.

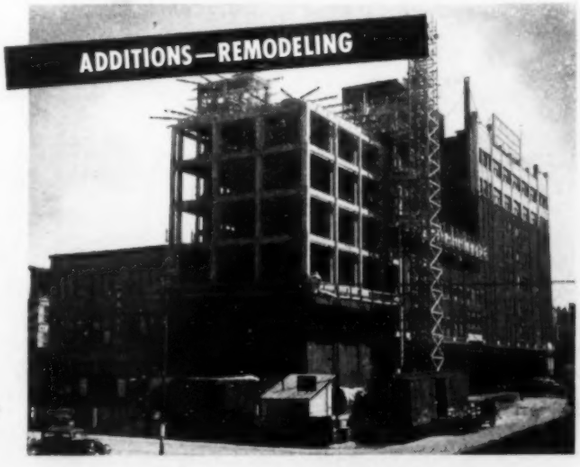
President, McGraw-Hill Publishing Company, Inc.

PLAN IT WITH 'INCOR'

'Incor' saved 17 days, no plant tie-up, in rebuilding 5600 sq. ft. loading dock



This new plant was in use 59 days sooner, thanks to good job-planning and 'Incor'



'Incor' saved 6 weeks and $1.96 per cu. yd. concrete on this Jerpe plant addition

SAVE—

- ☆ TIME
- ☆ LABOR
- ☆ MATERIALS

PLAN THAT JOB NOW . . . be ready for fast action when the time comes. With 'Incor' 24-Hour Cement, you pour concrete one day . . . use it the next. Note three consecutive jobs for Jerpe Commission Co., Omaha (Contractors, John Lof & Sons), where **'INCOR' REPEATED ON PERFORMANCE!**

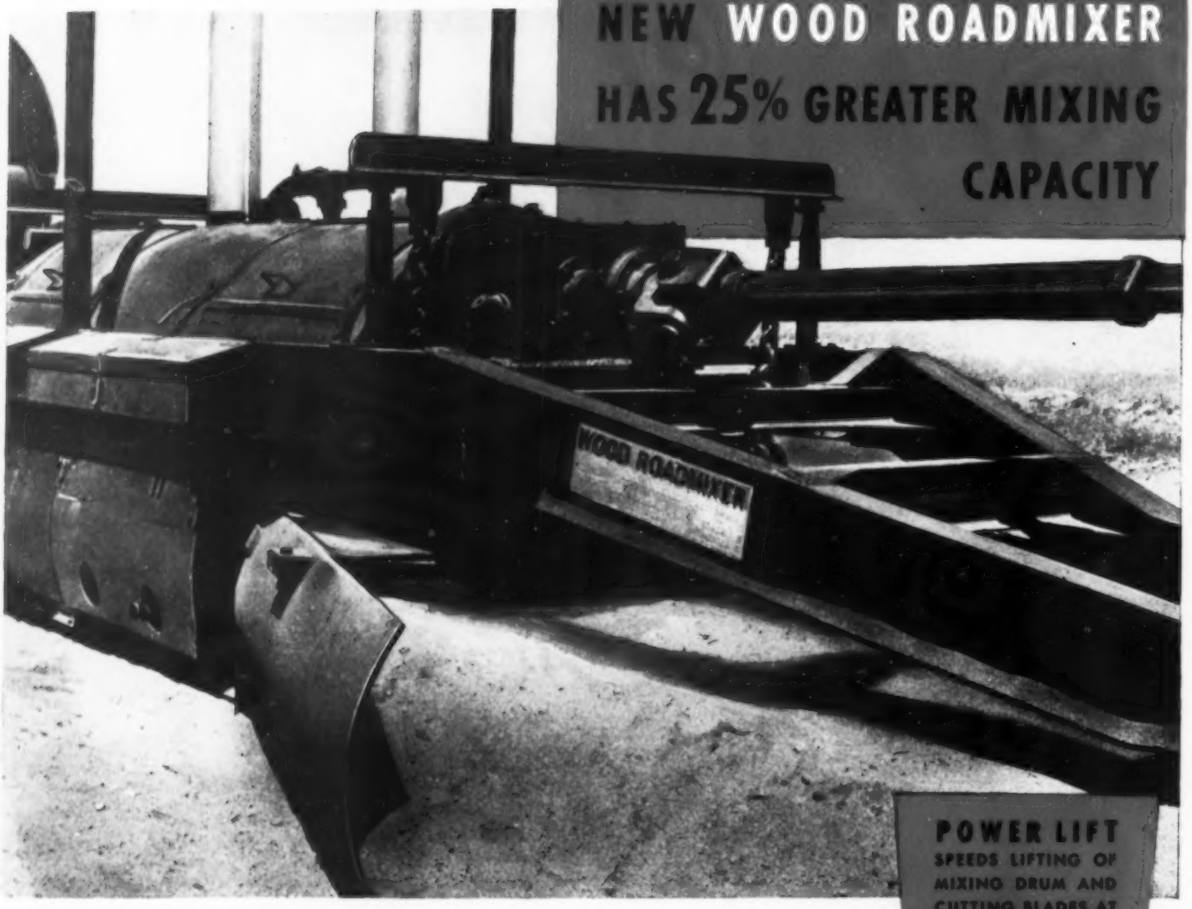
Estimate and build with 'Incor'. . . **SAVE 50% ON FORM MATERIALS AND LABOR . . . CUT TIME-OVERHEAD . . . GET EARLIER OCCUPANCY AT LESS COST.** On new structures and reconversion, use 'Incor'* for speed, quality, economy.

*Reg. U.S. Pat. Off.

LONE STAR CEMENT CORPORATION

Offices: Albany • Birmingham • Boston Chicago • Dallas • Houston • Indianapolis • Jackson, Miss. • Kansas City, Mo. • New Orleans • New York Norfolk • Philadelphia • St. Louis • Washington, D.C.

NEW WOOD ROADMIXER HAS 25% GREATER MIXING CAPACITY



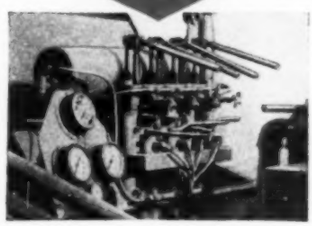
POWER LIFT SPEEDS LIFTING OF MIXING DRUM AND CUTTING BLADES AT END OF WINDROWS

HANDLES UP TO 8 CU. FT. WINDROWS

The increased mixing capacity of the new Wood Roadmixer, Model 54, makes possible the handling of up to 8 cu. ft. windrows. This means that many paving jobs ordinarily requiring two small windrows can now be handled with one large windrow. For example, the new Wood Roadmixer can build a 20 ft. highway 3" deep with ONE windrow in ONE PASS. The saving in windrow preparation and completion time is obvious. Another time-saving feature is the Power Lift which provides almost instant lifting of the mixing drum and cutting blades, either during the pass or at the end of the windrow. Larger discharge area and shorter turning radius are only two of many additional improvements.

In short, the NEW Wood Roadmixer is now, more than ever before, the fastest, most economical method of low-cost, top-quality pavement construction.

Write TODAY for complete details.



A COMPLETE TRAVELING MIXING PLANT

DESIGN FOR ROAD-MIX

WOOD ROADMIXER

Wood Manufacturing Co. • 816 West 5th St., Los Angeles 13, California

EFFICIENT for SHORT and LONG HAULS

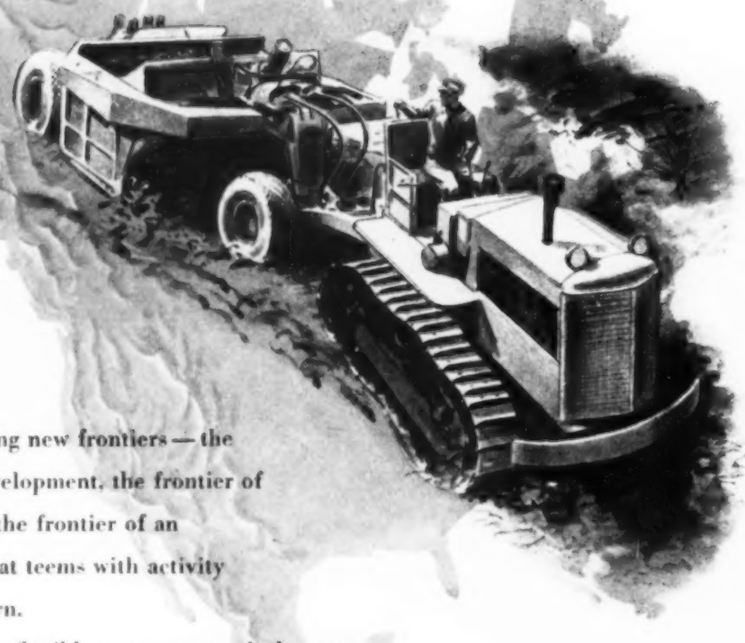
WHETHER your contract is large or small, the hauls short or long, Euclids will do the job faster at lowest cost per yard. Their overall speed, efficiency and large capacity have cut hauling costs for hundreds of contractors and industrial users on all types of off-the-highway jobs.

With modern loading equipment and Rear-Dump or Bottom-Dump EUCLIDS you can handle all kinds of excavation at lower cost than with other types or combinations of earth moving equipment. Check Euclid operation on any job for proof that they are efficient for all lengths of haul. Your Euclid distributor or representative is at your service to provide helpful facts and figures.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH ROCK COAL ORE

FROM ALASKA TO CAPE HORN



Diesel engines are opening new frontiers — the frontier of industrial development, the frontier of growing military might, the frontier of an awakened hemisphere that teems with activity from Alaska to Cape Horn.

Their contribution? More flexible, more economical power where, when, and as needed. Diesels help build airports, provide power for mines, get out rubber in Brazil — do useful work everywhere.

An era of even more intensive Diesel use lies ahead — an era in which the Diesel engine builders of America will render world-wide service to transportation, industry, and commerce.

As a supplier of fuel injection equipment to engine manufacturers, American Bosch continues to provide competent maintenance service, the widest variety of equipment, and experienced counsel in application engineering.

AMERICAN BOSCH CORPORATION • SPRINGFIELD, MASSACHUSETTS

AMERICAN BOSCH

AVIATION AND AUTOMOTIVE ELECTRICAL PRODUCTS • FUEL INJECTION EQUIPMENT

1894-1944

Pioneers for 50 Years

For half a century, The Cleveland Pneumatic Tool Company has devoted itself to serving many major industries.* Skilled technicians and experienced engineers within our organization have pioneered and perfected many products for each of these fields. Thus initiative and resourcefulness have enabled us to keep abreast of this country's remarkable industrial progress . . . We are commemorating our golden anniversary by continuing to put all our talents and energies in the fight to preserve the American way of life. We are proud to have grown with our nation for 50 years, and look forward to serving in the great future that lies ahead.

Buy U. S. War Bonds and Stamps

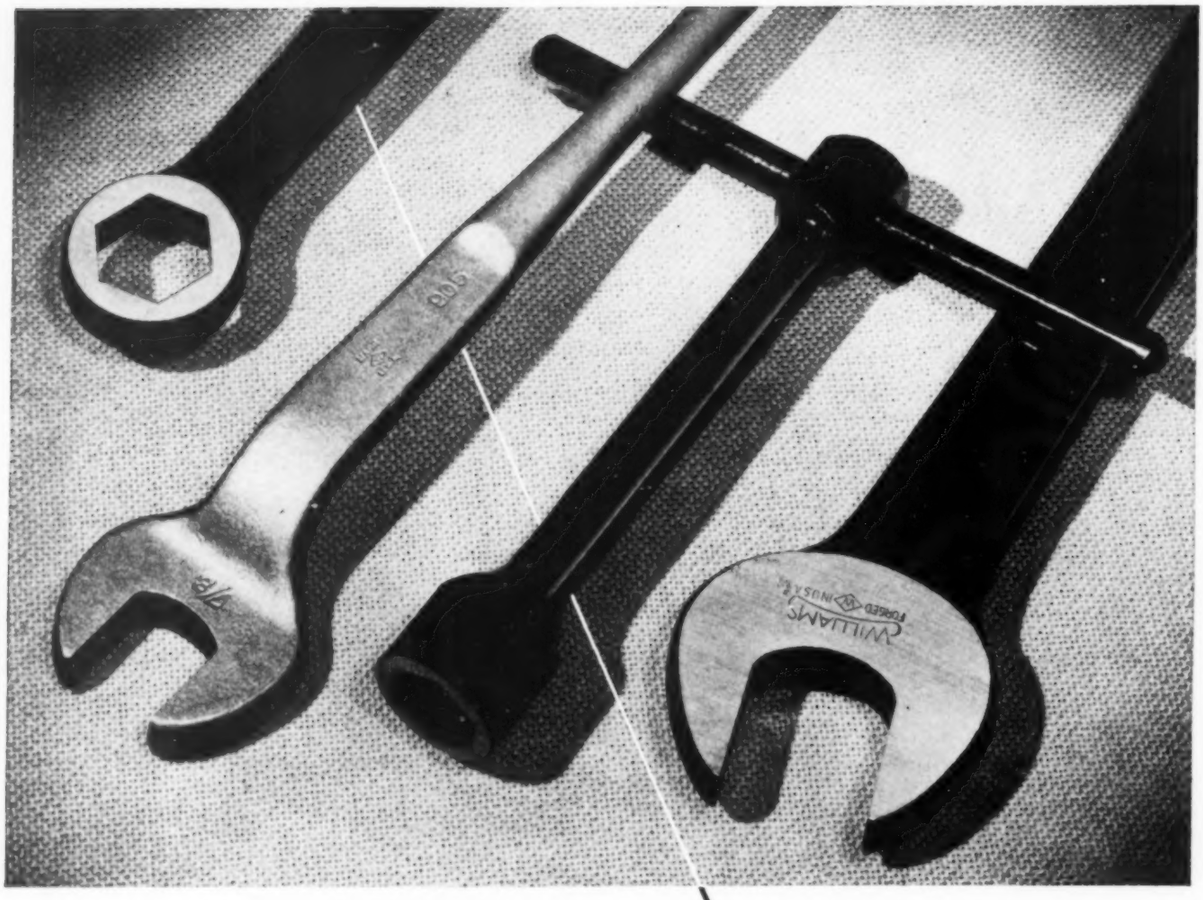
**CLECO Pneumatic Tools speed production in metal-working plants. AEROLS (the shock absorbing landing gear used so universally on aircraft) insure safe, smooth landings and take-offs. CLEVELAND Rock Drills are widely used in the mining and contracting fields. CLE-AIR Shock Absorbers protect buses, trucks and trailers from road shocks.*

THE CLEVELAND PNEUMATIC TOOL COMPANY

AND SUBSIDIARIES

THE CLEVELAND ROCK DRILL DIVISION **CLEVELAND PNEUMATIC AEROL, INC.**

CLEVELAND PNEUMATIC TOOL COMPANY OF CANADA, LTD.



To Win the War... To Keep the Peace

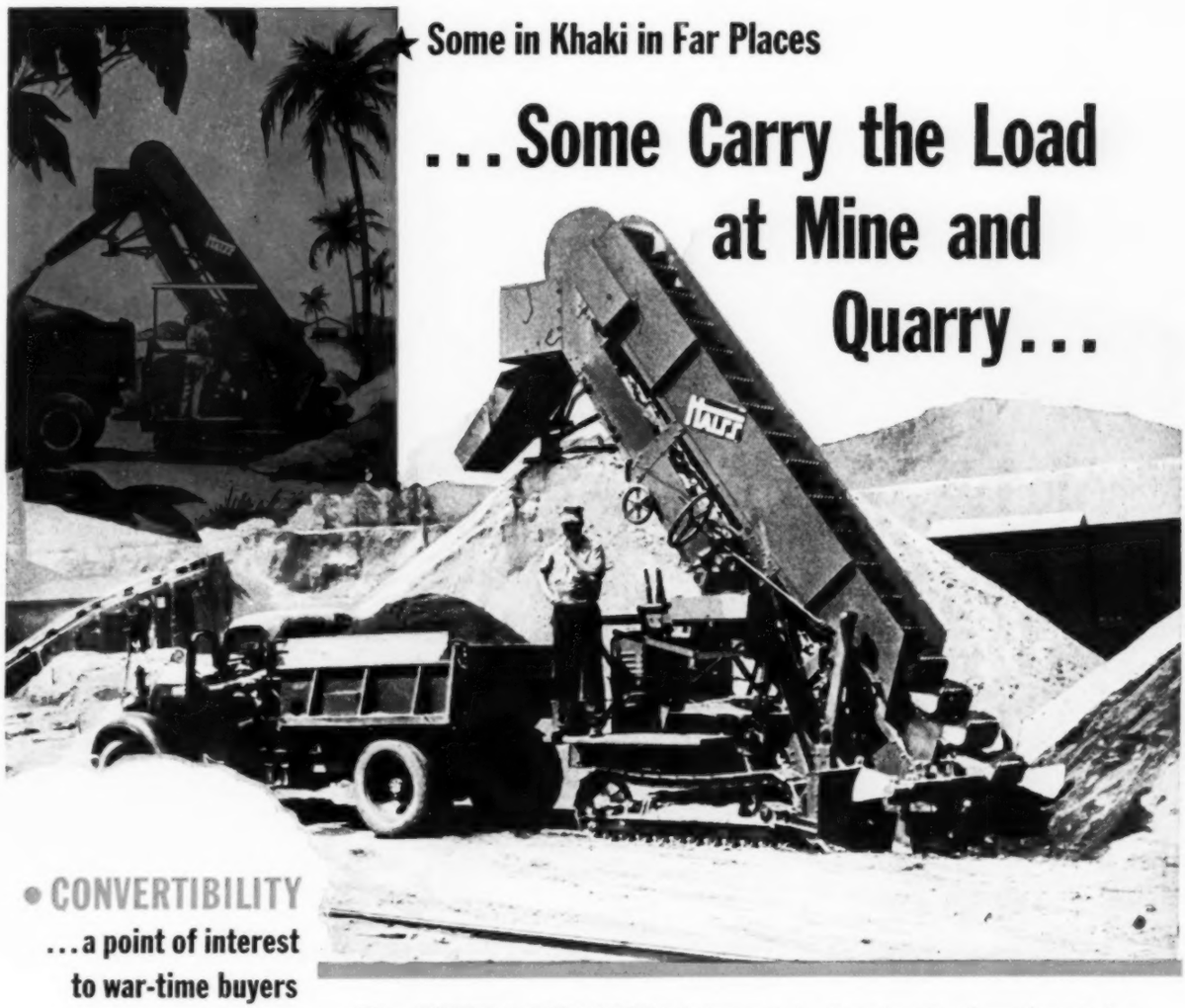
TOOLS by the tens of thousands are needed now to take the battle to our enemies. After Victory more thousands will be needed to arm the workers... to build automobiles, radios, refrigerators... all those needed things for which record demand is fast accumulating.

Our first job at Williams is war production. But we are eager for that happy tomorrow when we can again give industry new and better tools with which to build... to keep the peace... to seal the Victory!
J. H. Williams & Co., Buffalo 7, New York.

WILLIAMS
DROP-FORGINGS AND DROP-FORGED TOOLS

★ Some in Khaki in Far Places

...Some Carry the Load at Mine and Quarry...



• CONVERTIBILITY

...a point of interest to war-time buyers

The Haiss "75" Loader on creeper mounting is designed for the substitution of wheels and pneumatic tires, when the latter are again freely available.

No reason, then, to postpone buying.

The EXTRA STAMINA inherent in the simple, functional design of HAISS LOADERS is real. Whether loading precious chromite ore or hurrying repairs to a bomb-torn air field, they put up big truck-loads FAST . . . It's the pay off for HAISS superiority in positive self-feeding, efficient slow-speed "crowding" and a Haiss-designed heavy-duty transmission—with all clutches and gears running in oil . . . These same advantages make the HAISS a best buy on every loading job. *Catalog on Request.*

GEORGE HAISS MANUFACTURING CO., INC., 139th St. & Canal Pl., New York 51, N. Y.

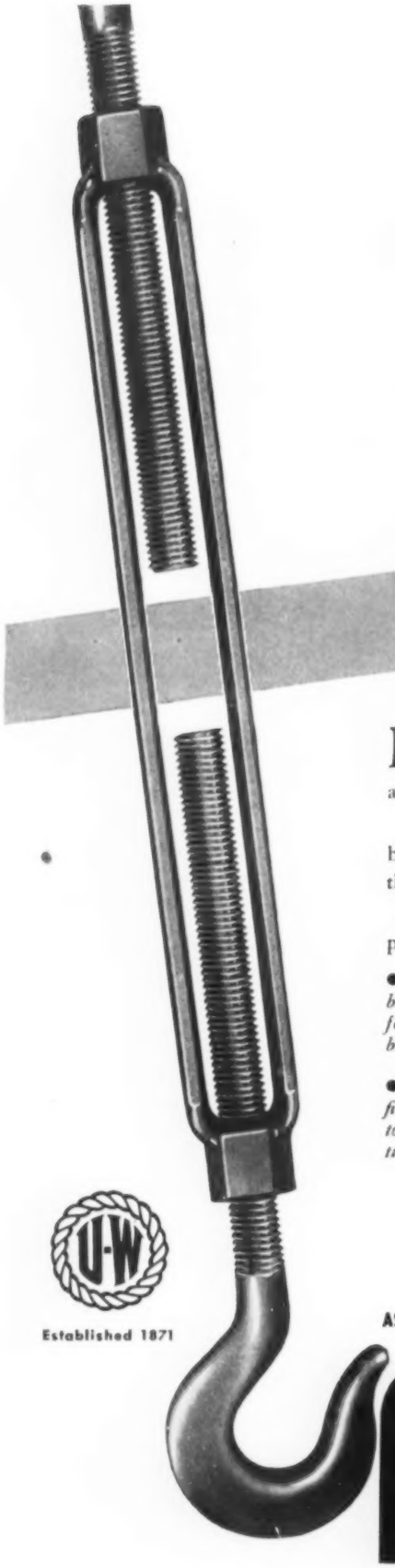
DISTRIBUTORS IN PRINCIPAL CITIES

•

Wire, write or phone for prices and catalog data

HAISS

PORTABLE CONVEYORS ★ LOADERS ★ CLAMSHELL BUCKETS



What makes this Upson-Walton Turnbuckle a better Turnbuckle

BUYING a turnbuckle is like buying a steak . . . or a watch . . . or a hammer—or anything! Exercise good buying judgment and you can always get something better.

Upson-Walton turnbuckles are *better turnbuckles*—and *better buys*—because of specific refinements in design and engineering initiated by this three-quarter-century old, modern company.

If you are using another make of turnbuckle now, check it against this partial list of Upson-Walton specifications.

- **The bodies** *of Upson-Walton turnbuckles are made in closed dies for uniformity—a 12″ Upson-Walton turnbuckle always gives 12″ of take-up.*
- **All Upson-Walton** *bodies and fittings are straightened after forging to insure a true thread and permit the turnbuckle to develop maximum strength.*
- **The body reins** *of all Upson-Walton turnbuckles are wider than the shank diameter—affording protection for the threads.*
- **Reins** *are constructed with ample section and rigidity, so that a bar may be safely inserted to set up tension.*
- **All Upson-Walton** *turnbuckles are designed so that heads have a full hex—a wrench can be applied on any pair of flats and have full bearing.*

U-W

Established 1871

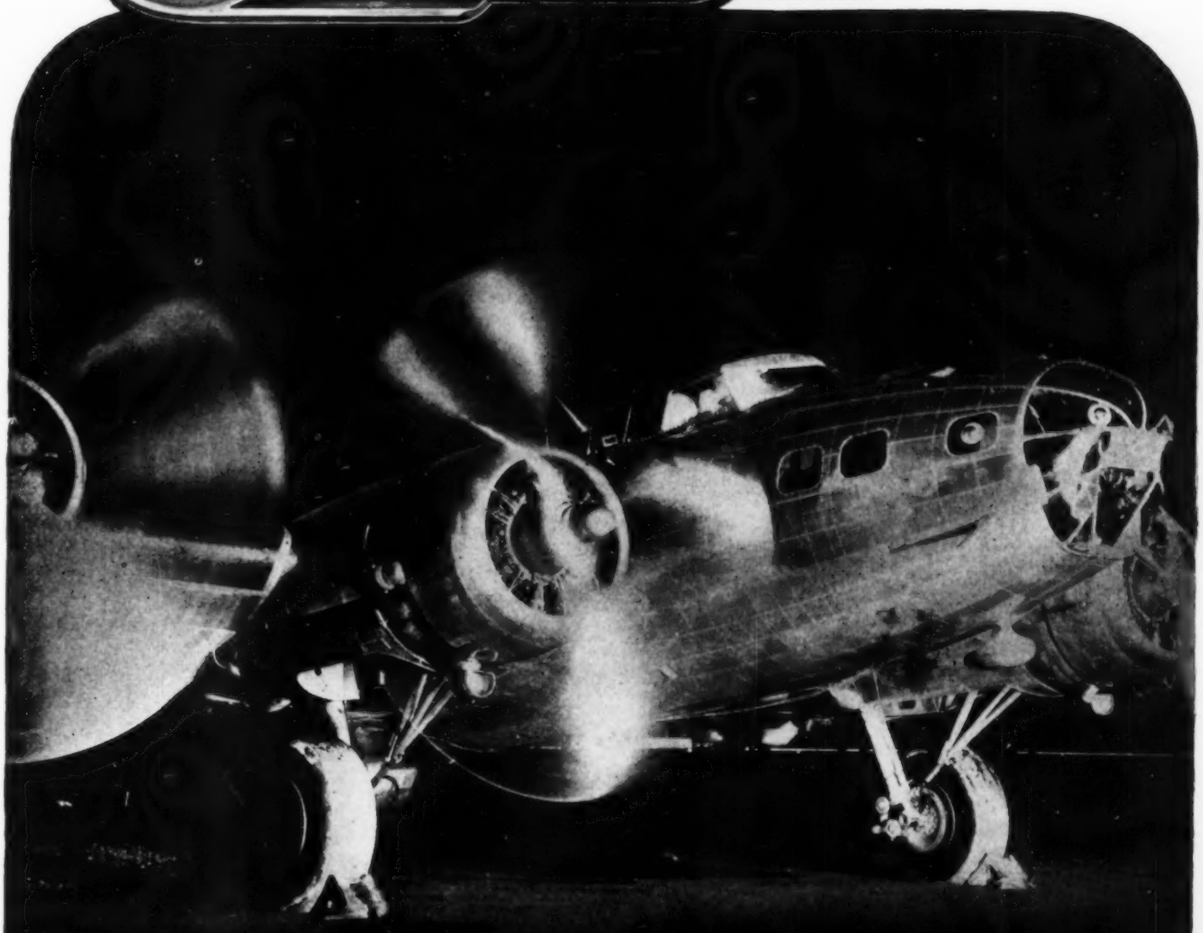
AS WE GO TO PRESS, DELIVERIES ON UPSON-WALTON TURNBUCKLES ARE GOOD.

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope. Wire Rope Fittings. Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

AIR PLUS JAEGER COMPRESSOR



We are producing for Uncle Sam today the compressor you'll demand tomorrow . . . built to the micro-precision of fine aircraft motors

Courtesy AVIATION

"AIR PLUS" Jaeger Vertical Two-Stage, Air-Cooled Compressors, in sizes from 60 to 500 ft., will be available to help you win your battles tomorrow.

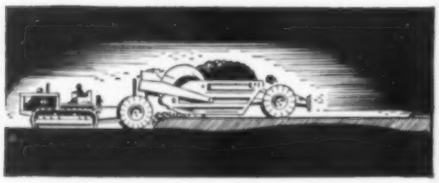
THE JAEGER MACHINE CO., COLUMBUS 16, OHIO

JAEGER *Engineered* EQUIPMENT

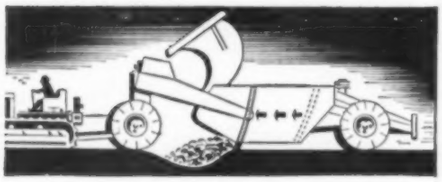
"AIR-PLUS" 2-STAGE AIR-COOLED COMPRESSORS, 60 TO 500 FT.—"FLEET-FOOT" CRANE-LOADERS—"SURE PRIME" CENTRIFUGAL PUMPS—"SPEEDLINE" BUILDING MIXERS—"DUAL-MIX" TRUCK MIXERS—"JAEGER" HOISTING ENGINES AND TOWERS—"JAEGER-LAKEWOOD" PAVING EQUIPMENT

How to Save Equipment and Manpower on

LEVELING *and* GRADING JOBS



To carry an even spread, the operator must lower the cutting edge to compensate for the extra height as the scraper's rear wheels climb onto the material spread ahead. The cutting edge in this manner acts as a strike-off in controlling the spread.



A reasonably good job of rough finishing can be accomplished with a scraper by pulling the rear gate to the front of the bowl and using it as a dozer blade to drift the material ahead into low spots. Try this money-saving idea on your next job; it works!

Wherever big yardages of dirt are involved, more and more contractors are finding it profitable to handle the complete job of leveling and rough grading with LaPlant-Choate "Carrimor" scrapers. On airports, highways, large building and irrigation projects, "Carrimors" permit more flexible operation because they dig, haul and spread their own loads. In addition, "Carrimors" carry the grade straight through in lifts of any desired depth, compacting the material as they travel over it. Result: your job is completed faster with fewer men—often without need for extra hauling, spreading and rolling equipment. See your LaPlant-Choate "Caterpillar" distributor today for complete details, or write for additional information. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

New Developments Coming!

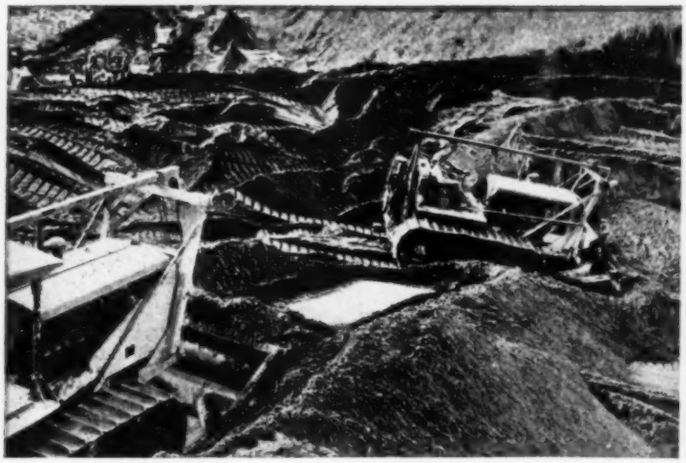
In the near future, LaPlant-Choate will announce a new line of improved cable and hydraulic scrapers, engineered exclusively for all sizes of "Caterpillar" track-type and rubber-tired tractors. These new LaPlant-Choate units will offer improvements never before dreamed of in the earth-moving industry—faster loading . . . quicker, cleaner dumping . . . lower costs per yard of material moved. Tomorrow more than ever before, you'll find that "you profit more with a Carrimor."

ARMY E NAVY

LaPLANT-CHOATE

Earthmoving and Land Clearing Equipment

AFTER THE WAR—WHAT?



OWNERS of "Caterpillar" Diesel equipment have every reason to ask what they can expect from "Caterpillar" when the war is over.

Long before Pearl Harbor and through every month since, the vast bulk of "Caterpillar" production has gone to war: first for defense, then direct to the fighting fronts. Few new machines have been available for civilian use.

What kind of "Caterpillar" Diesels are being turned out? Basically, they are the same tough, reliable machines that were doing the nation's heavy work when war began. No plant-wide conversion was required to put the factory on 100% war production. *It will not have to be reconverted for peace.*

The "Caterpillar" Diesel Tractors, Motor Graders, Engines and Electric Sets that will roll off the line on their way to "Caterpillar" dealers will be the best we know how to build—war-proved models, as modern as victory itself. They will be *worth waiting for.*

While the war goes on, and older machines must carry the load at home, no owner of a "Caterpillar" Diesel can afford to neglect his equipment. Enlist the "Fighting Four" for the duration—and depend on your "Caterpillar" dealer for able counsel and service.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

THE "FIGHTING FOUR"

INSPECT Look your equipment over frequently. For expert "internal" inspection of operating parts or functions, call in a trained "Caterpillar" service man. Read your Operator's Instruction Book.

LUBRICATE Use the right oil at the right time in the right place and in the right quantity. Keep the oil clean—change before it becomes dirty and deteriorated. Follow the Operator's Instruction Book.

ADJUST Tighten all bolts. Keep fan belt and tracks at proper tension. Read the Operator's Instruction Book. For fuel injection valves and other precision adjustments, let your experienced service-dealer do the work. He'll do it well.

REPLACE Have your service-dealer replace or repair worn bearings, track rollers, pins and bushings, sprockets, cylinder liners, clutch linings. His service helps restore power and extend equipment life. Saves critical materials, too.

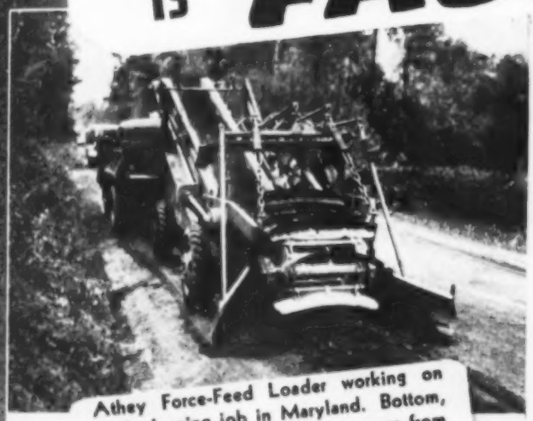
CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TO WIN THE WAR: WORK—FIGHT—BUY MORE WAR BONDS!

NOW - HIGHWAY MAINTENANCE LOADING

IS FAST AND SIMPLE...



Athey Force-Feed Loader working on ditch cleaning job in Maryland. Bottom, loader travels under its own power from one job to another at highway speed.

Loading surplus materials on highway maintenance or construction isn't the time-wasting task it used to be. Now, the self-propelled Athey Force-Feed Loader gathers up windrows of road material, on the move, and loads it into waiting trucks. The job is done quickly, economically and at a saving in war-vital manpower.

This time and labor saving tool works as a companion to the Motor Grader on road widening, ditch cleaning, shoulder trimming, road grading and maintaining, resurfacing highways and other operations. Athey Force-Feed Loaders load every kind of surplus road material faster and cheaper than ever before possible. A new folder describing this versatile loading unit will be mailed to you on request.

Write Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Illinois, or see your Athey-"Caterpillar" Dealer.

★ ★ ★

FREEDOM OF OPPORTUNITY
MADE AMERICA GREAT
. . . LET'S HOLD ON TO IT!

★ ★ ★

Athey

FORCE-FEED LOADER

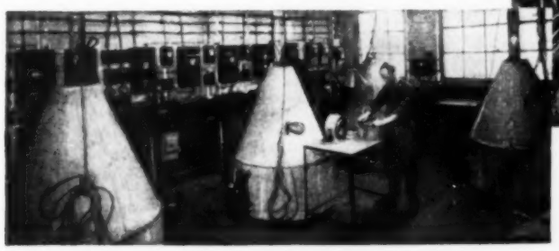
DOSE OF SALT

Encrusted with chemical salts, this Tri-Clad motor continues to drive a pump without breakdown of its insulation. In almost every industrial plant, motors are called upon to keep going under conditions which try their endurance to the limit. It may be in a plating room, or on an exhaust fan, or in a wet sub-cellar, or — as in this case — in connection with chemical processing. In emergencies, open motors may face conditions for which good engineering practice would require totally enclosed construction — conditions which tend to corrode the frame and attack the insulation. Endurance of Tri-Clad motors under such conditions results from tests like the one described below.

Salt-spray test of TRI CLAD motors gives assurance of long life in severe service

In this accelerated life test to determine the ultimate endurance of their insulation, the motors are operated to failure under one of the worst possible combinations of conditions. They are continually exposed to a 2% salt-water spray, while operating on a duty cycle of 3 minutes on and 37 minutes off. (These repeated voltage surges impose greater stress on the insulation than would continuous operation.) Tests are run on all new insulations developed, and as a production check on motors taken at random off the assembly lines. Because of their endurance under this severe test, among others, Formex* wire and Glyptal* bonding material were chosen for Tri-Clad insulation.

*Reg. U. S. Pat. Off.



Left: Conical hoods cover the tanks in which these salt-spray tests are conducted.

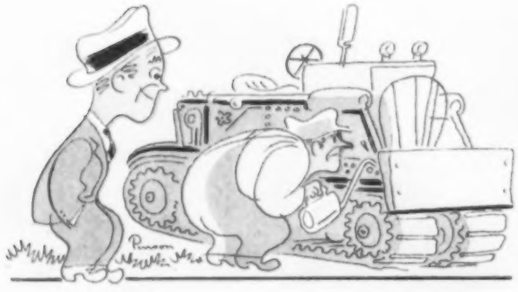
GENERAL ELECTRIC

TRI CLAD MOTORS

Every week 192,000 G-E employees purchase more than a million dollars' worth of War Bonds.

QUICK **Q** *UIZ FOR CONSTRUCTION MEN*

Three Answers that May Save You Hundreds of Dollars!



Q Are your machines capable of "M. P. T."?*

A Not if they're stopped too long or too often for lubrication. For instance: Alemite Lubrication Specialists showed one contractor how to reduce lubricating time on a group of 5 machines by 50% — actually gaining 100 minutes "M. P. T." per day. This new method paid for itself in a short time. (Interested in details about the New Alemite Portable Service Stations?)

* *More Productive Time*

Q Can track roller and other bearing failures be reduced?

A Certainly! One contractor suspected that many of his bearing failures were unnecessary. Alemite Lubrication Specialists proved him right with an "on the job" method of lubrication. Track roller and other bearing expense was reduced by 25%. Time was saved for much needed production. In addition, consumption of lubricants was reduced 10%. (An example of the efficiency of Alemite Portable Service Stations.)

Q Have your greases and oils the "versatility" your jobs call for?

A "Yes," if they're Alemite's. The reason: Alemite builds an extra-wide operating range into every grease and oil. The result is amazing toughness that fights friction successfully in the hottest summer operating temperatures. Alemite #33, an exclusive Alemite grease, is extremely water-repellent, endures tremendous loads, can't clog grease guns or bearing lubricant grooves. Ask about it.

"LUBRI-*chaos*" Takes Its Toll In Money, Machines and Production

Even the best managed construction set-ups can have "Lubri-*chaos*." Today's "impossible" schedules, far-flung projects and increase of inexperienced help has shown up "Lubri-*chaos*" for the costly evil it is.

Alemite, as the pioneer in pressure lubrication, has worked for years to end the nightmare of "Lubri-*chaos*." Now, when the "heat" is on, the Alemite method of handling and application of lubricants and oils is providing the answer to "Lubri-*chaos*" and is proving its worth on construction projects everywhere.

The Alemite method will play an important role in peacetime competition. That's why foresighted operators are getting together with Alemite Lubrication Specialists *now* to gain the competitive advantage of the world's most modern lubricating methods. For consultation without obligation, write Alemite, 1840 Diversey Parkway, Chicago 14, Illinois, or Belleville, Ontario.

Alemite Portable Service Stations are complete power lubrication departments on wheels that carry lubricants to machines on the job. They include high- and low-pressure Alemite Barrel Pumps, Alemite Motor Oil dispenser, hose reels and gas engine air compressor. Write for catalog.

Another Product of STEWART WARNER

ALEMITE

First in Modern Lubrication

CONSULTATION • LUBRICANTS • MAINTENANCE • EQUIPMENT • ENGINEERING

Dependable "PREformance

Dependable equipment is a means to efficient performance. This is one important "WHY" of America's magnificent production record.

Our own high standards in *every* phase of wire rope manufacture over a period of many years, has made it possible for our product to shoulder a greater share of the extra burden imposed by war. Preformed "HERCULES" (Red-Strand) Wire Rope is especially qualified for the more difficult jobs. The inherent qualities of this time-tested rope, *plus* the advantages of Preforming — make for easier, quicker and safer work . . . more production from each pound of steel . . . greater efficiency.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

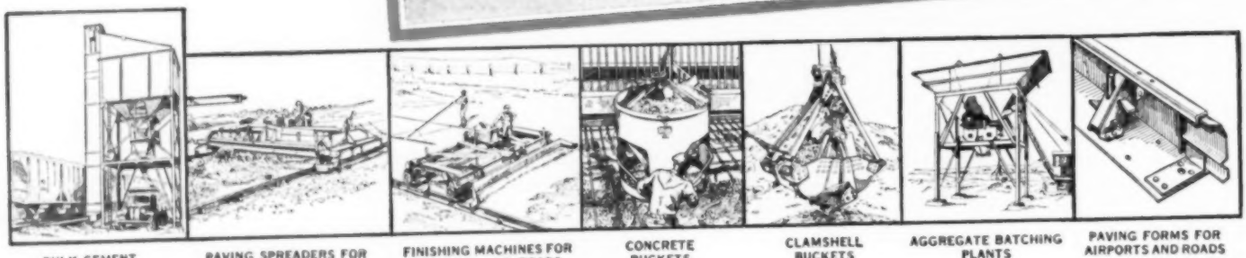
NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

Use this up-to-date

Dry, harsh, concrete paving mix being handled by Blaw-Knox Transverse-Blade Automatic Type Concrete Paving Spreader equipped with vibratory attachment. Concrete tested ½ to ¾ inch slump. Contractor's production in spite of difficult concrete was in excess of 400 lineal ft. of 12 ft. wide slab 9" thick per hour. Spreader-Vibrator is one man operated. Vibration increased strength of concrete by 25 per cent.

View behind Blaw-Knox Spreader-Vibrator shown in upper photograph. Concrete has been spread to required elevation and simultaneously compacted by vibratory attachment. Note uniformly smooth surface behind vibrator. Blaw-Knox Finishing Machine worked closely behind Spreader-Vibrator and kept pace easily. Cores drilled from completed pavement showed no honeycomb at bottom of slab or at joints and no excess mortar at surface of pavement.



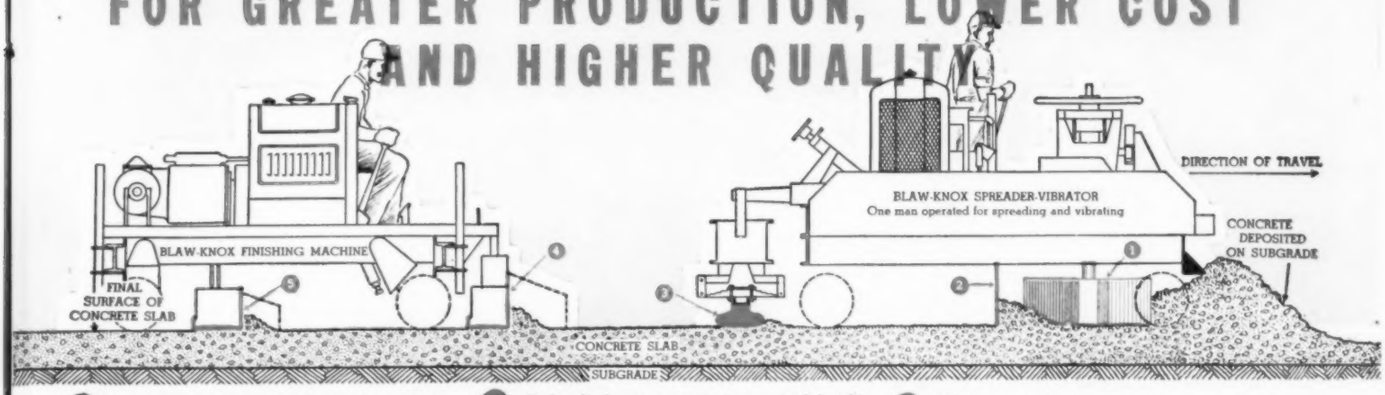
BULK CEMENT PLANTS | PAVING SPREADERS FOR AIRPORTS AND ROADS | FINISHING MACHINES FOR AIRPORTS AND ROADS | CONCRETE BUCKETS | CLAMSHELL BUCKETS | AGGREGATE BATCHING PLANTS | PAVING FORMS FOR AIRPORTS AND ROADS

KNOW YOUR BLAW-KNOX DISTRIBUTOR

ALABAMA
Birmingham — Standard Con. Supply Co.
ARIZONA
Phoenix — State Tractor Equipment Co.
ARKANSAS
Little Rock — Lyons Machinery Company
CALIFORNIA
Los Angeles — Le Roi-Rix Machinery Co.
E. M. Ornitz
San Francisco — C. H. Grant Company
COLORADO
Denver — Ray Corson Machinery Co.
CONNECTICUT
New Haven — W. I. Clark Co.
DELAWARE
Philadelphia, Pa. — Giles & Ransome
DISTRICT OF COLUMBIA
Washington — Matt A. Deutsch Mach. Co.
FLORIDA
Jacksonville — Florida Equipment Co.
Miami — Florida Equipment Company.
Tampa — Epperson & Company
GEORGIA
Atlanta — W. C. Caye & Company
IDAHO
Boise — Intermountain Equip. Co.
ILLINOIS
Chicago — O. T. Christerson Co.
St. Louis, Mo. — O. B. Avery Company
INDIANA
Indianapolis — Reid-Holcomb Co.
Chicago, Ill. — O. T. Christerson Co.
Louisville, Ky. — Brandeis Machinery & Supply Co.
IOWA
Davenport — Gierke-Robinson Co.
Des Moines — Herman M. Brown Co.
KANSAS
Kansas City — G. W. Van Keppel Co.
KENTUCKY
Louisville — Brandeis Mach. & Supply Co.
LOUISIANA
New Orleans — Southern States Equip. Co.
MAINE
Portland — Stanley-Cadigan Company
MARYLAND
Baltimore — Henry H. Meyer Co., Inc.
MASSACHUSETTS
Boston — The Equipment Company
New Haven, Conn. — W. I. Clark Co.
MICHIGAN
Detroit — Wm. P. Favorite Company
Grand Rapids — Contractors Mach. Co.
Iron Mountain — Service & Supply Division of Lakeshore Engineering Co.
MINNESOTA
Duluth — Borchert-Ingersoll, Inc.
St. Paul — Borchert-Ingersoll, Inc.
MISSISSIPPI
Amory — Dalrymple Equip. Co.
New Orleans, La. — Southern States Equipment Co.
MISSOURI
Kansas City — G. W. Van Keppel Co.
St. Louis — O. B. Avery Company
MONTANA
Billings — Western Const. Equip Co.
NEBRASKA
Omaha — Anderson Equipment Co.
NEVADA
Los Angeles, Cal. — E. M. Ornitz
San Francisco, Cal. — C. H. Grant Co.

paving method

FOR GREATER PRODUCTION, LOWER COST AND HIGHER QUALITY



1. Automatic Transverse Spreading Blade spreads concrete transversely and at the same time pushes excess concrete ahead of machine; adjustable for spreading height.
2. Strike-off shapes concrete to required height and crown allowing slight excess for compaction by vibrator; strike-off is hydraulically adjustable for elevation.
3. Vibratory attachment compacts concrete simultaneously with spreading operation; vibrator is spring suspended and does not rest on side forms. All vibratory effect is transmitted directly to the concrete. Vibrator is controlled by spreader operator and leaves slight excess of concrete for finishing machine.
4. Finishing Machine front screed strikes off excess of concrete to exact grade and crown. Finisher has easy and rapid operation; follows close behind Spreader-Vibrator.
5. Rear screed of Finishing Machine performs final finishing and smoothing operation.

The method of paving construction illustrated has been proved on hundreds of miles of concrete paving construction for roads and airports.

The dry and harsh concrete mixes frequently specified by engineers for modern pavements can be spread, compacted and surfaced most rapidly and efficiently by the combination of the Blaw-Knox Transverse-Blade Type Automatic Concrete Paving Spreader equipped with vibratory attachment and the modern Blaw-Knox Finishing Machine.

The Spreader-Vibrator spreads the concrete to the required depth and at the same time compacts the concrete by vibration. The Finishing Machine follows close on the heels of the Spreader-Vibrator and does a quick and easy surfacing job. The Blaw-Knox Spreader-Vibrator teamed with the Blaw-Knox Finishing Machine handles the output of two 34-E dual drum paving mixers.

Difficult concrete is easily handled on a production basis by this up-to-date paving method and the contractor gains — in greater yardage, lower construction cost, minimum of manual operations and higher quality paving.

The Blaw-Knox Finishing Machine can also be equipped with a vibratory attachment. However, experience has shown that the paving vibrator mounted on the spreader provides better compaction, more practical operating procedure, and maximum production of paving slab. The Spreader-Vibrator always remains with the paving mixer and does not have to move back to aid in correction of high or low areas.

Blaw-Knox Spreaders and Finishers including vibratory attachments are available in standard sizes as follows: 10-15 ft. adjustable width, 20-25 ft. adjustable width.

Your Nearest Blaw-Knox Distributor Will Promptly and Efficiently Handle Your Inquiries for Construction Equipment.

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2086 Farmers Bank Bldg., Pittsburgh, Pa.
NEW YORK · CHICAGO · PHILADELPHIA
BIRMINGHAM · WASHINGTON
Representatives in Principal Cities

KNOW YOUR BLAW-KNOX DISTRIBUTOR

NEW HAMPSHIRE
Barre, Vt. — Casellini-Venable Corp.
Boston, Mass. — The Equipment Co.
Portland, Me. — Stanley-Cadigan Co.

NEW JERSEY
New York, N. Y. — R. E. Brooks Company
Philadelphia, Pa. — Giles & Ransome

NEW MEXICO
Albuquerque — Hardin & Coggins

NEW YORK
Albany — Larkin Equipment Co.
Buffalo — Trevor Corporation
Elmira — LeValley, McLeod & Kinkaid
Endicott — Newing Motors Co., Inc.
New York — R. E. Brooks Company
Rochester — Keystone Builders Supply
Syracuse — Syracuse Lumber Co.
Utica — McQuade & Bannigan, Inc.

NORTH CAROLINA
Raleigh — Carolina Tractor & Equip Co.
Salisbury — Carolina Tractor & Equip Co.

NORTH DAKOTA
Fargo — Dakota Tractor & Equipment Co.

OHIO
Cleveland — H. B. Fuller Equipment Co.
Columbus — W. W. Williams Co.

OKLAHOMA
Oklahoma City — Leland Equipment Co.

OREGON
Portland — Contractors Equipment Corp.

PENNSYLVANIA
Philadelphia — Giles & Ransome
Pittsburgh — Dravo-Doyle Company

RHODE ISLAND
Boston, Mass. — The Equipment Co.

SOUTH CAROLINA
Columbia — Jeff Hunt Road Machinery Co.

SOUTH DAKOTA
Rapid City — J. D. Evans Equip. Co.

TENNESSEE
Chattanooga — Nixon-Hasselle Co.
Knoxville — Wilson-Weesner-Wilkinson
Nashville — Wilson-Weesner-WilkinsonCo
Memphis — Road Bldrs. Equip. Co.

TEXAS
Dallas — Conley-Lott-Nichols Mach. Co.
Houston — R. B. Everett & Co.

UTAH
Salt Lake City — Lund Machinery Co.

VERMONT
Barre — Casellini-Venable Corp.

VIRGINIA
Roanoke — Roanoke Tractor & Equip. Co.

WASHINGTON
Seattle — Star Machinery Co.
Spokane — Empire Equipment Company

WEST VIRGINIA
Charleston — Charleston Tractor & Equip Corp.

WISCONSIN
Milwaukee — Hunter Tractor & Mach. Co

WYOMING
Billings, Mont. — Western Construction Equipment Co.
Denver, Colo. — Ray Corson Mach. Co.

ALASKA
Seattle, Wash. — Northern Commercial Co.

CANADA
Halifax, N. S. — Coleman Mach. Co., Ltd
Montreal — Watson Jack & Co., Ltd.
Toronto — W. L. Ballentine Co.
Vancouver, B. C. — B. C. Equip. Co., Ltd
Winnipeg — Kane Tractor & Equip. Co.

NEW FOUNDLAND
St. Johns — Dominion Dist. Co.

JOB DOWN!

8 hours . . . or . . . 11 days?
808 yds. . . . or . . . 8888 yds?
$62.88 . . . or . . . $691.68?

When a vital part snaps and the job is stalled you begin to do some real figuring. Suppose you were renting a tractor, bulldozer and scraper and there was a 1000 foot haul, the bulldozer being used as a pusher serving the scraper.

If you had to send to the factory for the new part you'd be 11 days behind, still have 8888 yds. of dirt to move and be out $691.68 plus the cost of the new part and your normal profit on the job.

But —because you find an A.E.D. member near your job—he has the part, or the men and equipment to make and install the part, it only cost you 8 hrs. delay—808 yds. and $62.88 in lost rental and operator's time.

There are more than 500 A.E.D. members ready to save you dangerous delays on that rush war-time job. As neighbors of yours they do double duty—First to save you money and time—second to bring the manufacturers' full service to your doorstep.

ASSOCIATED EQUIPMENT DISTRIBUTORS

★

Executive Office
National Press Bldg.
Washington, D. C.

★

ASSOCIATED EQUIPMENT DISTRIBUTORS — AED — MEMBER

★

Ask for
a list of your neighborhood
A.E.D. members.

★

LOOK FOR THE A.E.D. INSIGNIA—THE SYMBOL OF GOOD SERVICE

USED BY U.S. ARMY

-SAVES TIME FOR YOU!

MOBILUBE "V" is designed primarily for wheel bearings and grease-type universal joints, but is also recommended for clutch release bearings and other parts operating at high temperatures. It's a special, short-fiber soda soap grease . . . used on hard-fighting U. S. Army vehicles . . . Remarkably efficient and long-lasting . . . Recommended for year-around service. Means FEWER LUBRICANTS in your shop, gives BETTER SERVICE.

OTHER SOCONY-VACUUM TIME-SAVERS:

DELVAC OILS—For *all* automotive-type Diesel and heavy-duty gasoline engines. Effectively minimize sludge deposits. Resist formation of oil-oxidation products. Will not corrode hard-alloy bearings. Result: Far cleaner, safer engines than is possible with older-type oils.

MOBILUBE GEAR OILS—Highly stable, straight mineral oils made specially for heavy-duty service. Free of abrasives, soaps, fillers, foreign materials of any kind—will not thicken excessively when cold. Superior protection against "scuffing"—dangerous gear wear!

Talk with your Socony-Vacuum Representative

Mobilgas
SOCONY-VACUUM

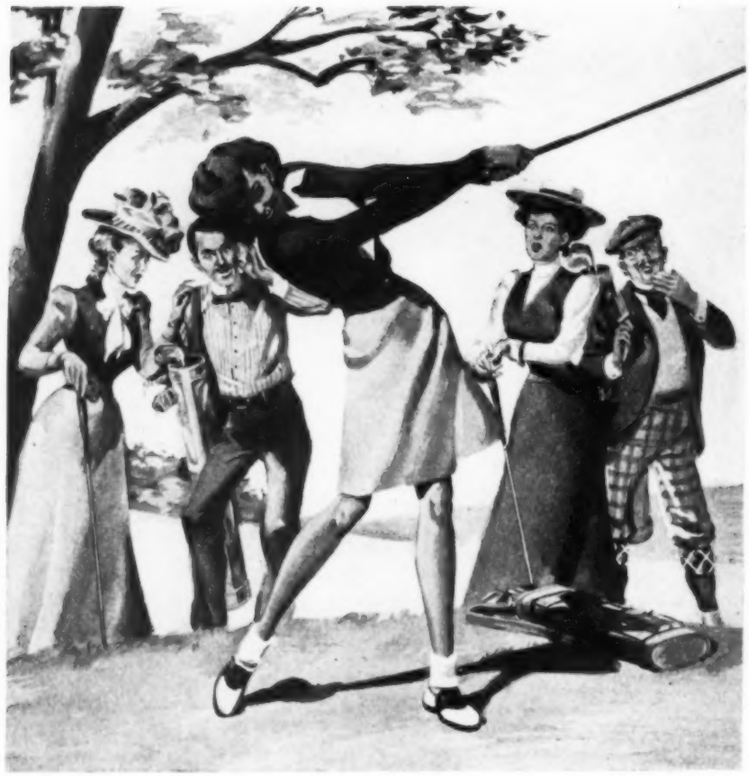
USE SOCONY-VACUUM FUELS, LUBRICANTS, AND ENGINEERING SERVICE!

KEEP ENGINES "ON SCHEDULE" WITH SOCONY-VACUUM'S FAMOUS

MOBILUBE "V"

SOCONY-VACUUM OIL CO., INC., and Affiliates: Magnolia Petroleum Co., General Petroleum Corp. of Calif.

There's been a big change



PLUS-FOURS once brought in the low scores. And long skirts were the only acceptable dress. But all things change.

Even roller bearings have advanced. Tyson's new "All-Rolls" design is recognized as a vast improvement by users of heavy-duty equipment.

Size for size, Tyson has *thirty percent more load-carrying rollers*—for greater strength and rigidity . . . for longer life . . . for maximum efficiency.

In Army and Navy equipment—in vital industry, transportation, agriculture—the big name in bearings today is . . . **TYSON!**

TYSON BEARING CORPORATION, MASSILLON, OHIO

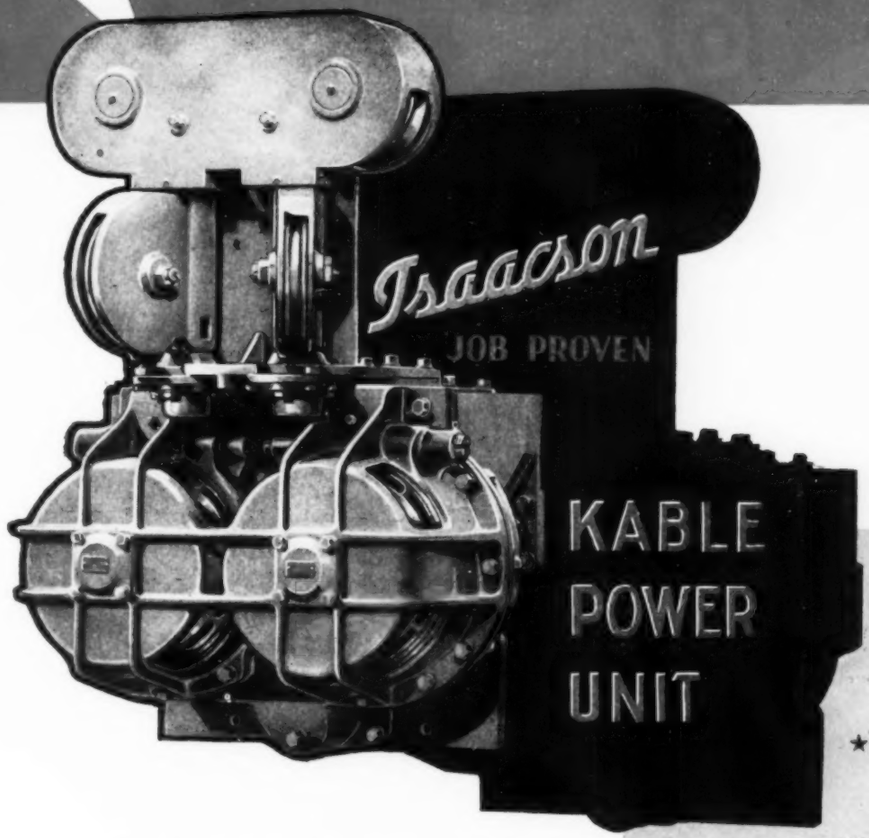
COUNT THE ROLLS - THE ROLLS COUNT

Tyson

TODAY'S HEAVY-DUTY BEARING

★ KEEP ON BUYING WAR BONDS ★

Holds ADJUSTMENT



★ Simple to adjust

★ Smoother operation

★ No operator fatigue

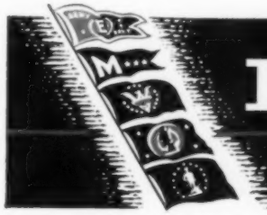
★ Precision built for long life

★ Less cable wear

Also available as single drum for front or rear operation.

COVERED BY U. S. AND FOREIGN PATENTS

Isaacson Kable Power Units eliminate those tiresome tuning up jobs before "Blue Top" finishing. This is a feature your operator will appreciate, and one that will save you money on your show. Gone, too, is the finicky balance between clutch and brake adjustments. This new improved Kable Power Unit is not an untried and experimental flash. . . . No, sir; for three years these units have been on the job in tough, grinding day-in and day-out service. They have proved themselves beyond the shadow of a doubt; and we know they stand up to that high standard of performance you are entitled to expect of quality tractor equipment. Write for detailed specifications.



ISAACSON

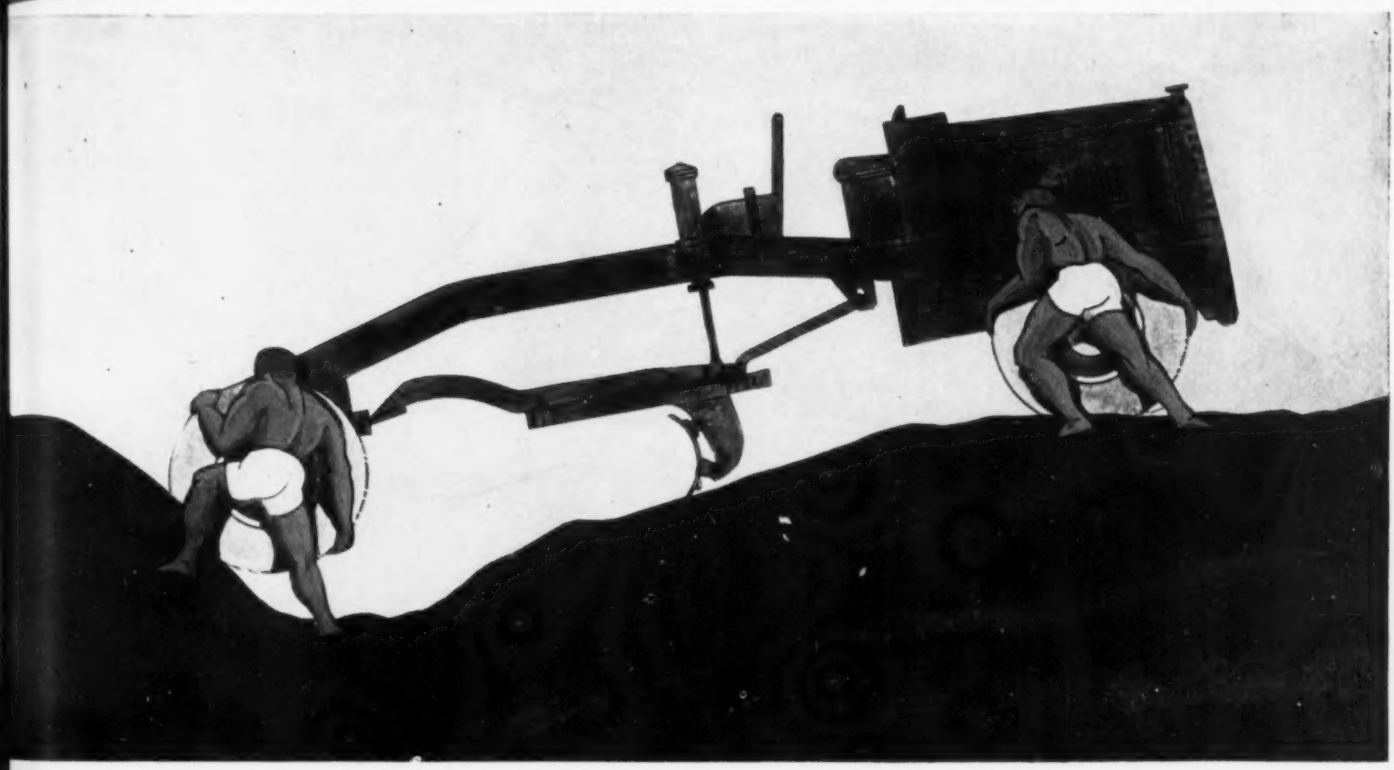
Iron Works

SEATTLE

ENGINEERED TRACTOR EQUIPMENT

● On the ordinary Motor Grader, the front end is just that much dead weight which the rear end has to push around. The grader may be heavy, but *total weight* is not the measure of Motor Grader operating efficiency. What counts is the useful working weight carried on driving wheels; all other weight consumes power and is a definite handicap in many ways.

your horsepower!



● On the "99-M" Power Grader, there are no idling front wheels . . . no dead front end to consume power and decrease operating efficiency. All of the weight is on the driving wheels—front and rear—contributing 100% to traction; providing tremendous climbing power in the front drivers, and enabling the "99-M" to outperform all other Motor Graders, definitely and completely, on job after job.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY

Austin Western

SINCE 1859

BUY MORE WAR BONDS

BACK OF EVERY ATTACK . . .

Preformed wire rope

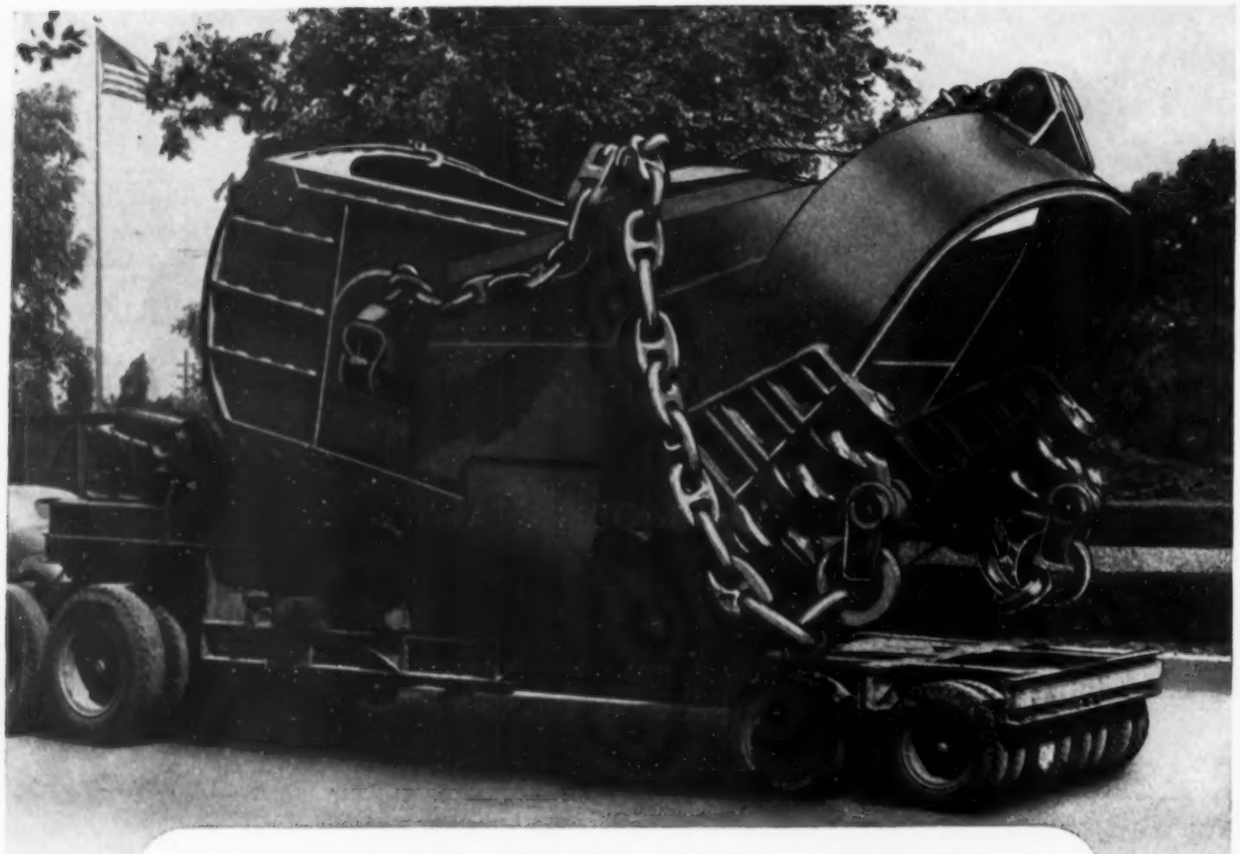
Preformed wire rope gives sinews of steel to bulldozers that clear the way so jeeps, planes, and trucks can advance. Preformed is in the fight on practically every kind of mobile war machine.

Men who use Preformed wire rope know that it outlasts and outworks ordinary wire rope. That it handles easier—speeds up operations—safeguards men and equipment.

In the past, Preformed has proved it is the wire rope for the tough peacetime jobs. Today, back of every attack, it is proving that it is the wire rope for the tough war jobs.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER FOR PREFORMED WIRE ROPE

Talk to Northwest owners NOW!
YOU'RE planning for the future—making up your mind about methods, jobs, personnel, equipment.
The pressure of war construction, more than ever before, is showing the difference in performance between equipment built to do a job and equipment built to meet a price.
Talk to Northwest owners! Learn something about the type of performance that Northwests are giving under the conditions of continuous service and high pressure war jobs.
You'll learn why one out of every three Northwests for years has been a repeat order in the hands of the nation's leading contractors.
Ask how the Northwests are doing!
NORTHWEST ENGINEERING CO.
1728 Steger Bldg., 28 E. Jackson Blvd.
Chicago 4, Illinois
Six more NORTHWESTS
Remember
That Geo. W. Condon
Omaha, Nebraska
bought SIXTEEN
NORTHWESTS
Thirtynine Northwests for Welsh Construction Co. and Geo. F. Driscoll Co. New York, N. Y.
39
This makes the Seventeenth
NORTHWEST
-and when you have a real Rock Shovel you won't have to worry about output in dirt
NORTHWEST



COAL STRIPPER STANDARDIZES ON THE IMPROVED *Automatic* DRAGLINE BUCKET

● Shown above is a giant 25-cubic-yard Page AUTOMATIC dragline bucket, as it left the factory for delivery to the Northern Illinois Coal Corporation of Wilmington, Illinois.

Recognized as a pioneer of coal stripping with heavy dragline equipment, this firm has progressively replaced all other buckets with Page Improved AUTOMATICS in 5, 8, 12, 14 and 25-cubic-yard sizes.

RESULTS: *A tremendous increase in overburden removed, coupled at the same time with greatly reduced operating and maintenance costs.*

PAGE

Automatic **DRAGLINE BUCKETS**

PAGE ENGINEERING COMPANY, CHICAGO 38, ILLINOIS

Groundwork for Air Power

BATTERIES of Tournapulls, dozers, scrapers almost overnight transform the rough terrain of invaded areas into emergency flying fields. This high-yardage dirt moving needs the rugged power of *heavy-duty* engines.

To maintain continuous, hard-hitting performance of Diesels and heavy-duty gasoline engines, contractors everywhere have found definite help through *effective* lubrication...Texaco.

Texaco Ursa Oil X★★, for example, is an additive type heavy-duty oil that is both detergent and dispersive. Its detergency keeps piston rings free and engine parts clean. Its dispersive ability holds deposit-forming materials in suspension until drained at oil change. *Ursa Oil X★★* protects alloy bearings and prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmission and differential gears, use Texaco gear lubricants.

Texaco lubricants have proved so effective in service that they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT – CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

AN OPEN LETTER

TO THE NATION'S ROAD BUILDERS

HUBER is pleased to announce plans have been perfected to build a complete line of modern road machinery the moment the war ends. The line will include: Three-wheel Type Road Rollers from 5 to 12 tons; Tandem Rollers from 3½ to 12 tons; Maintainer, Bulldozer, Speed Scoop, Sweeper, Mower and Snow Plow.

To make sure the plans were right, a thorough research into the postwar future of road building and maintenance was made. To these findings were added HUBER'S seasoned knowledge of Road Builder's needs plus its years of experience in building dependable road machinery. With such a background to draw upon, the new HUBER Line becomes an outstanding contribution to the road building industry and the greatest achievement in HUBER'S history.

To insure manufacturing excellence in building this new HUBER Line, thousands of dollars have been invested in the latest of machine tools and production methods. HUBER is proud of its new Road Machinery for it measures up in every way to the big demands that will be made on it when the postwar road building activities start. Distributors interested in the new HUBER Line are urged to write us. Some choice territories are still available.

Don Howard

President.

★ Announcing

A NEW CATALOG

★ One hundred pages of wellpoint facts, plus two hundred "on the job" photos showing the dewatering of practically every type of construction project. A copy is yours for the asking.

MORETRENCH CORPORATION

90 WEST STREET, NEW YORK 6, N. Y.

CHICAGO, ILL. ROCKAWAY, N. J. NEW ORLEANS, LA.

MORETRENCH CORPORATION
90 West Street
New York 6, New York

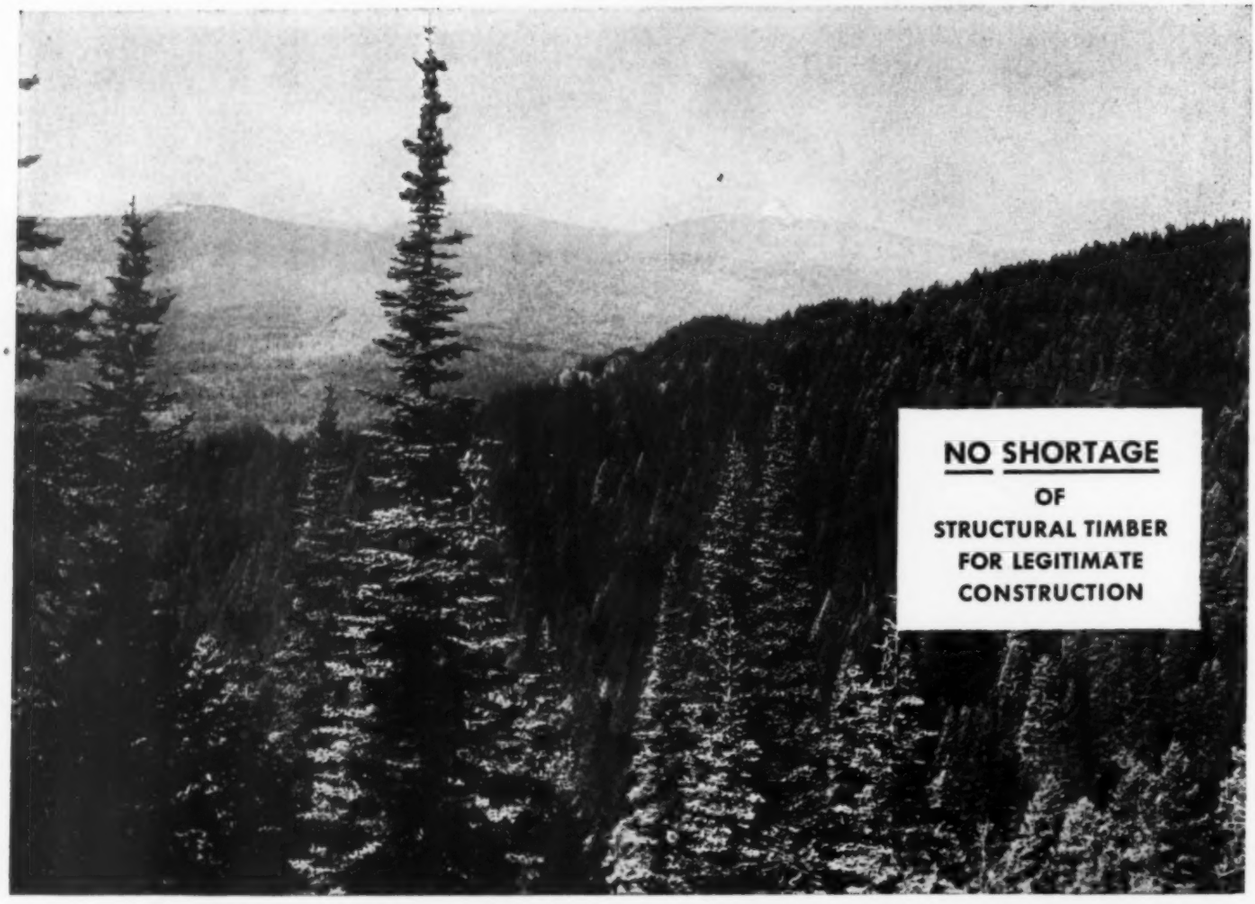
Gentlemen:
Please send me a copy of your new catalog "Working in the Dry with a Moretrench Wellpoint System."

Name .....

Company .....

Address .....

.....



50% of the nation's stand of virgin timber is in Oregon and Washington. Available supplies of structural timber 3 in. and thicker from these forests run from 15 to 20 million bd. ft. each week.

AVAILABILITY IS IMPORTANT

...BUILD WITH TIMBER STRUCTURES

There is plenty of construction timber. Rumors and statements regarding a shortage of large dimension lumber are unfounded and harmful to those who wish to use structural timber in their projects, to the lumber industry, to timber fabricators who are geared to the efficient speedy delivery of trusses and other heavy items so important in modern construction.

In the interest of straight thinking, here are the facts:

1. From 15 to 20 million bd. ft. of structural timber is available weekly.
2. WPB and the West Coast Lumberman's Association are on record as stating that timber and planks 3 in. and thicker are readily available.
3. WPB's "critical" category relates almost wholly to 1 in. and 2 in. boards of which some 15 billion bd. ft. (many times normal requirements) will be needed this year for boxing and crating.
4. No legitimate construction job need be deferred because of lack of structural timber; the prosecution of such jobs will help to increase production of boards to meet unprecedented demands for crating and boxing.

We repeat: There is no shortage of structural timber. Our Portland, Ore. plant has a fabrication capacity up to 400,000 bd. ft. per day and yearly production exceeding 80 million bd. ft. of prefabricated lumber.

Large lumber storage capacity plus proximity to the forests and mills of the Northwest makes possible the maintenance of sufficient quantities and sizes of material to fill orders promptly. Inquiries are welcomed and given prompt attention. If present or future building plans are under consideration, write for booklet "*Engineering in Wood*" illustrating work we have done, are doing.

Engineering in Wood

TIMBER STRUCTURES
WARD MAYER
INCORPORATED

Portland 8, Ore. New York 17, N.Y.

Follow Owners of All Makes to Your

CHEVROLET DEALER'S

CAR OWNERS

TRUCK OWNERS

You'll say

"1st IN SERVICE"

Skilled, Trained Mechanics

Special Tools and Equipment

Genuine Parts

Courteous, Efficient Service on All Makes

Go to "Automotive Service Headquarters." . . . See your Chevrolet dealer today and at regular intervals. . . . Let him help you to keep your car or truck serving dependably and economically for the duration!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

Get a

"SIX-STAR SERVICE SPECIAL" Today!

BUY MORE WAR BONDS . . . SPEED THE VICTORY

READY TO MAKE EYES FOR UNCLE SAM—

45 DAYS SOONER!

New lens plant of the Bell & Howell Company, Chicago. Architects, Mundie, Jensen, Bourke & Havens, Chicago. General contractors, Dahl-Stedman Company, Chicago.

Six weeks saved by Atlas High-Early cement in construction of lens plant

THIS new Bell & Howell Company plant, now turning out lenses for the Army and the Navy, started doing it weeks ahead of schedule, thanks to Atlas High-Early.

Construction work was started in the summer of 1942 by the general contractors, Dahl-Stedman Company of Chicago. This was a rush job, for Uncle Sam needed more lenses as quickly as they could be made.

That's why Atlas High-Early cement was used for the concrete work. According to Frank L. Hall, General Superintendent of Dahl-Stedman, its use enabled them to make a saving of approximately 45 days in construction time because forms could be stripped sooner than with normal portland cement.

Contractors throughout the country know they can depend on Atlas High-Early cement to save time and help them meet or beat construction schedules. They can strip forms sooner and reuse them more often, and secure usable concrete sometimes days ahead of normal schedules.

Before you start your next rush job, ask for more information about Atlas High-Early and for experience records on other jobs. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

* * *

OFFICES: *New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Minneapolis, Duluth, Cleveland, St. Louis, Kansas City, Des Moines, Birmingham, Waco.*

SAVE TIME IN WARTIME WITH

Atlas High-Early Cement

A UNIVERSAL ATLAS PRODUCT

CM-H-64

The illustration is a reduced reproduction of a poster sent to various suppliers of essential equipment by Caterpillar Tractor Co.

YOU – Men And Women Of DIAMOND CHAIN AND MANUFACTURING COMPANY

Through your skill and patriotism throughout 1943 have helped us materially to meet our country's quotas for war machinery urgently needed on far-flung World Battlefronts. Thanks!

Caterpillar Tractor Co.

THEY FOUGHT THE BATTLE OF PELICAN RAPIDS

Over the far northern ridgepole of the continent, U. S. Army Engineers, co-operating with contractors and Canada's Imperial Oil Company, are rushing a pipeline of vital importance to Allied fighting men. It will cross the frozen tundra and leap the Rockies, carrying high-grade crude 529 miles from the Ft. Norman oilfield on the Mackenzie to Whitehorse in Yukon Territory. There a new refinery will convert the oil into gasoline for the planes and trucks that roar along the Alcan route with supplies for our Alaskan bases. The pipeline is the hilt of a spear pointed straight at the throat of Japan.

Already, in building it, tough men and machines have written an epic of heroic effort. And in the van of the struggle, night and day, "Caterpillar" Diesel Tractors have done their important part.

From the railhead, the pipe was carried north 300 miles by barges and tow-boats. They traveled smoothly enough until they reached the thunderous Pelican Rapids, where the rocky bed of the Slave River falls more than a hundred feet. There "Caterpillar" Diesels saved the day. Roughing out a 16-mile portage road through the bush around the rapids, they hauled the 65-ton barges, the tugs and the pipe overland to navigable water!

The rugged power of "Caterpillar" Diesel Tractors, Graders, Engines and Electric Sets has earned the praise of fighters on every war front. These sturdy machines are hauling big guns, clearing beachheads, building roads and airfields, powering pumps and compressors, generating electricity for lights and communication, afloat and ashore.

The armed forces have first call on all new "Caterpillar" production. But rendering a vast range of service at home are thousands of older machines. To conserve their usefulness is the task of "Caterpillar" dealers everywhere. They are using efficient methods, special equipment and extraordinary skill to keep "Caterpillar" Diesels working with the least expenditure of money and critical materials.

CATERPILLAR DIESEL

REGISTERED TRADE MARK

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS, U. S. A.

TO WIN THE WAR! WORK—FIGHT—BUY VICTORY BONDS!

To help in producing our country's war machinery—is a great privilege. To be given recognition of this help is appreciated by all the men and women in the Diamond Chain organization.

Years of proved performance on construction machinery fitted Diamond Roller Chain Drives for the war-job machinery of leading manufacturers building roads through mud, sand, frozen tundra—airfields, military posts, bridges, water and oil supply systems.

Records are being made in Alaska, Attu, Canada, Africa, Europe and the Pacific Islands—records that are replete with stories of accomplishments almost too fantastic to relate—the one concerning Pelican Rapids being an example.

On such equipment Diamond Roller Chain Drives have again proved their ruggedness, long life reliability, great reserve strength—and high power transmitting efficiency.

The great work being done on all war fronts by American construction machinery is a preview of peace-time possibilities when building America will proceed again at full speed. DIAMOND CHAIN & MFG. CO., 418 Kentucky Avenue, Indianapolis 7, Indiana.

DIAMOND **ROLLER CHAINS**

CORRECT Lubrication means Better Maintenance

U. S. Signal Corps Photo

CORRECT lubrication makes for better maintenance by preventing excessive wear.

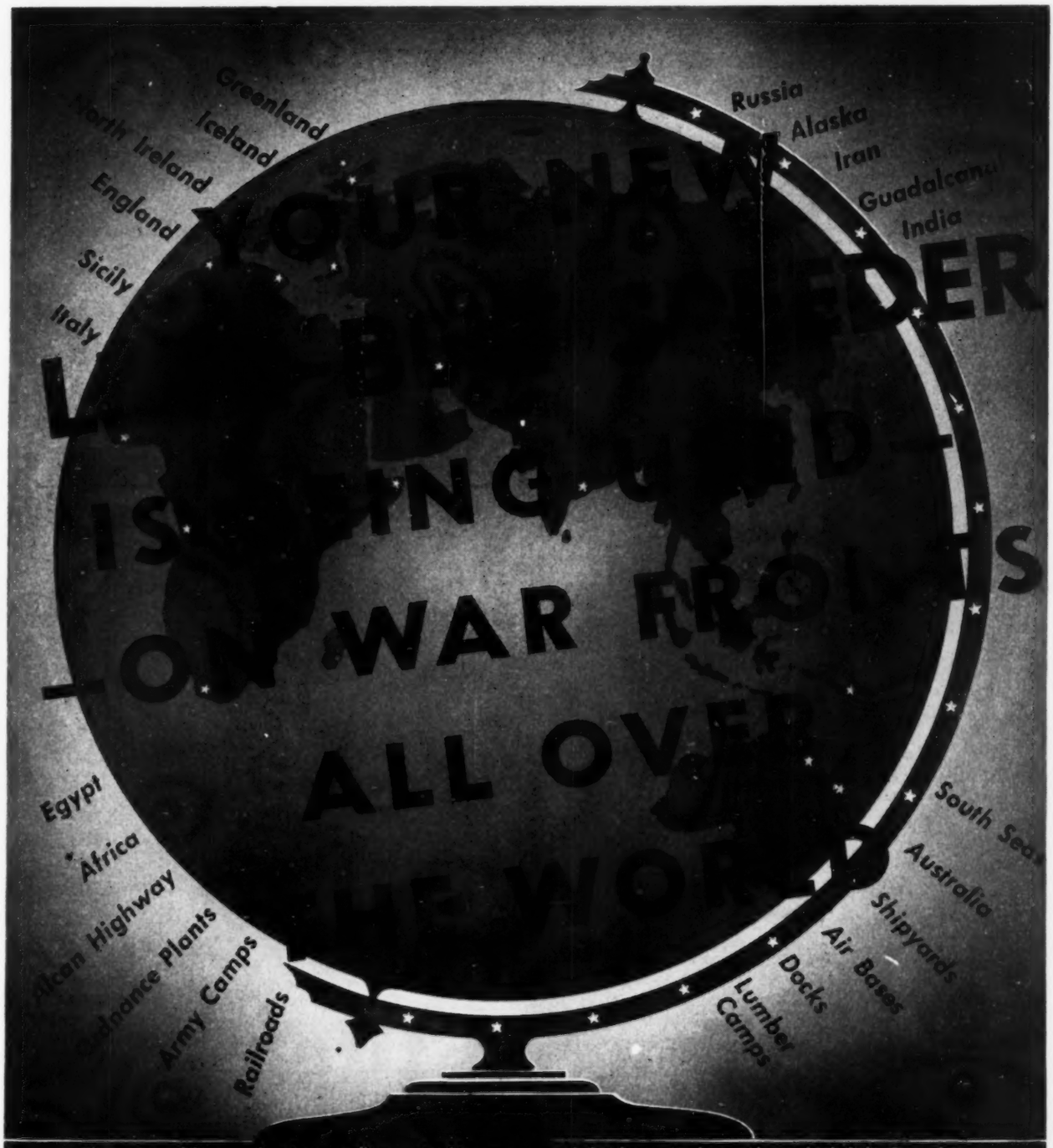
Sinclair TENOL-200 provides *correct* lubrication under heavy duty operation for Diesels, and Diesel-powered bulldozers, buckets, and shovels. Sinclair specialized oils and greases are highly efficient on all types of hard worked equipment.

Where operating conditions threaten excessive wear and overhaul shutdown there is a lubrication problem. Consult us about it.

(Write for "The Service Factor" — published periodically and devoted to the solution of lubricating problems.)

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



They are lifting, digging, pulling, stacking—performing the many heavy-duty jobs that must be done to get war material to the front. Whether it is building a logging road in Oregon, a thoroughfare to Alaska or docks, camps, roads and bridges, in Iran, these Link-Belt Speeders are giving yeoman service—showing up at its best the precision engineering—the massive, though light-weight, rugged construction of these easy-to-handle machines.

9575

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO-9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

Ten-ton tire

A typical example of B. F. Goodrich product development

A TIRE like this weighs only a *third* of a ton but can carry a *load* of *ten* tons, forty tons or more for four tires — nearly as much as a freight car. It is used for off-the-road hauling. It holds as much air as 25 auto tires, takes 20 minutes to inflate, costs $750.

The Pennsylvania Turnpike, finished five years ago, might still be under construction if there were no big tires like this. Dams and airports now finished in 18 months would probably take four and five years to build. But even with all their advantages, costs were too high because these tires, running over big rocks, bruised too easily. Inner cords broke under sharp impact; tires had to be repaired or thrown away. Time and money were lost.

Then B. F. Goodrich men developed a new kind of "bruise-protected" tire. It has four extra layers of cords embedded under the rubber tread, and with a special kind of rubber between them. Under impact the cords distribute the force of the blow and allow it to be absorbed by the rubber.

Contractors tried the new tires. Some of the records were: 17,226 miles against 12,501 for the best of all three ordinary tires used; 15,017 miles compared to 11,304 for the best ordinary tire; 17,599 miles compared to 6,476 for the best ordinary type. There would be even more such records if military needs permitted more contractors to get these new tires.

B. F. Goodrich developments extend to every type of tire — passenger car, truck, airplane, farm, industrial, and the big off-the-road type. Whatever your tire need, if you buy B. F. Goodrich, you get tires backed by this policy of constant improvement. OEL

B.F. Goodrich
Truck & Bus Tires

AMERICA IS *Built with Aggregate!*

Cedarapids

Built by IOWA

THE IOWA LINE

of Material Handling Equipment Includes

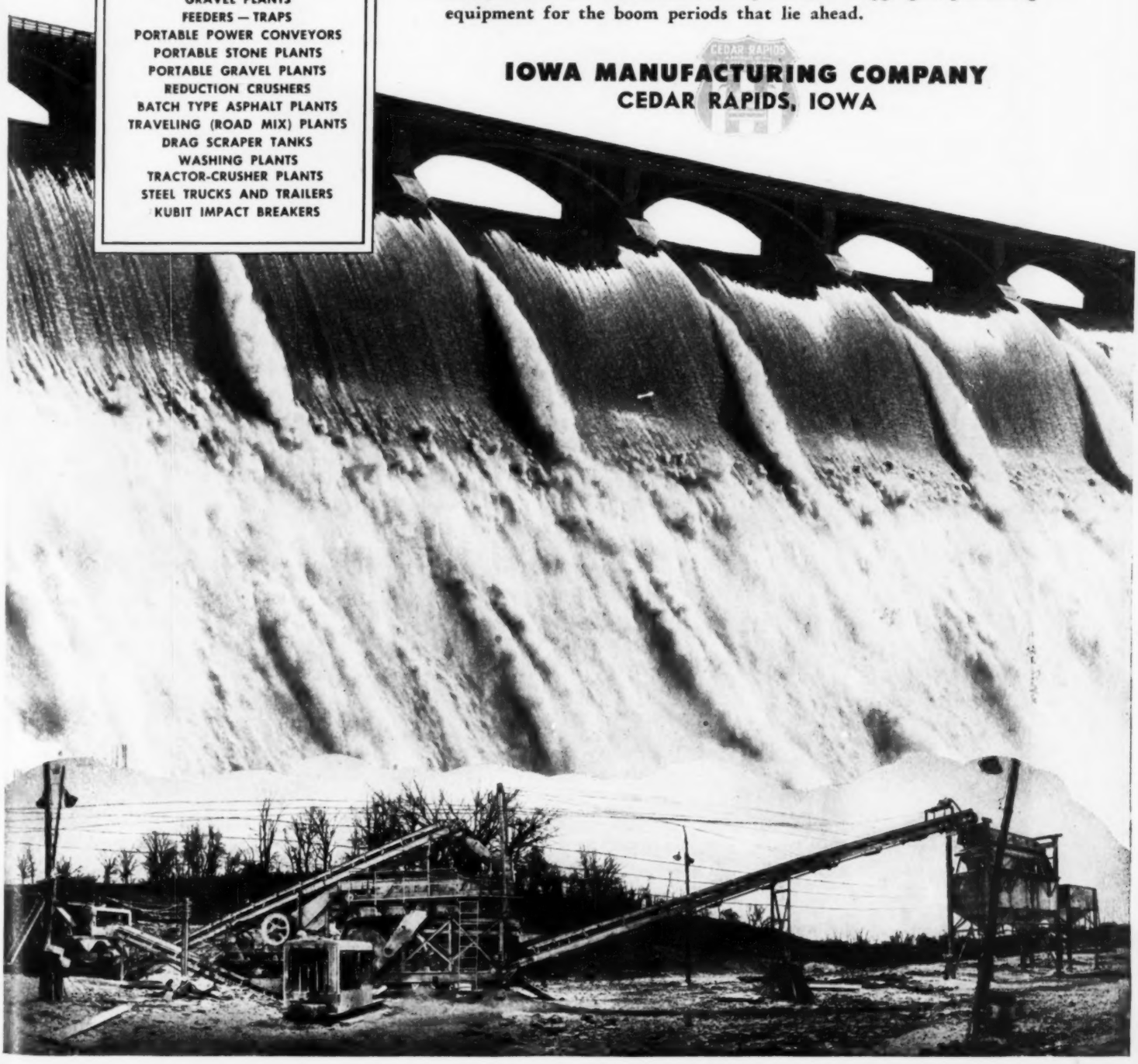
ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS — STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

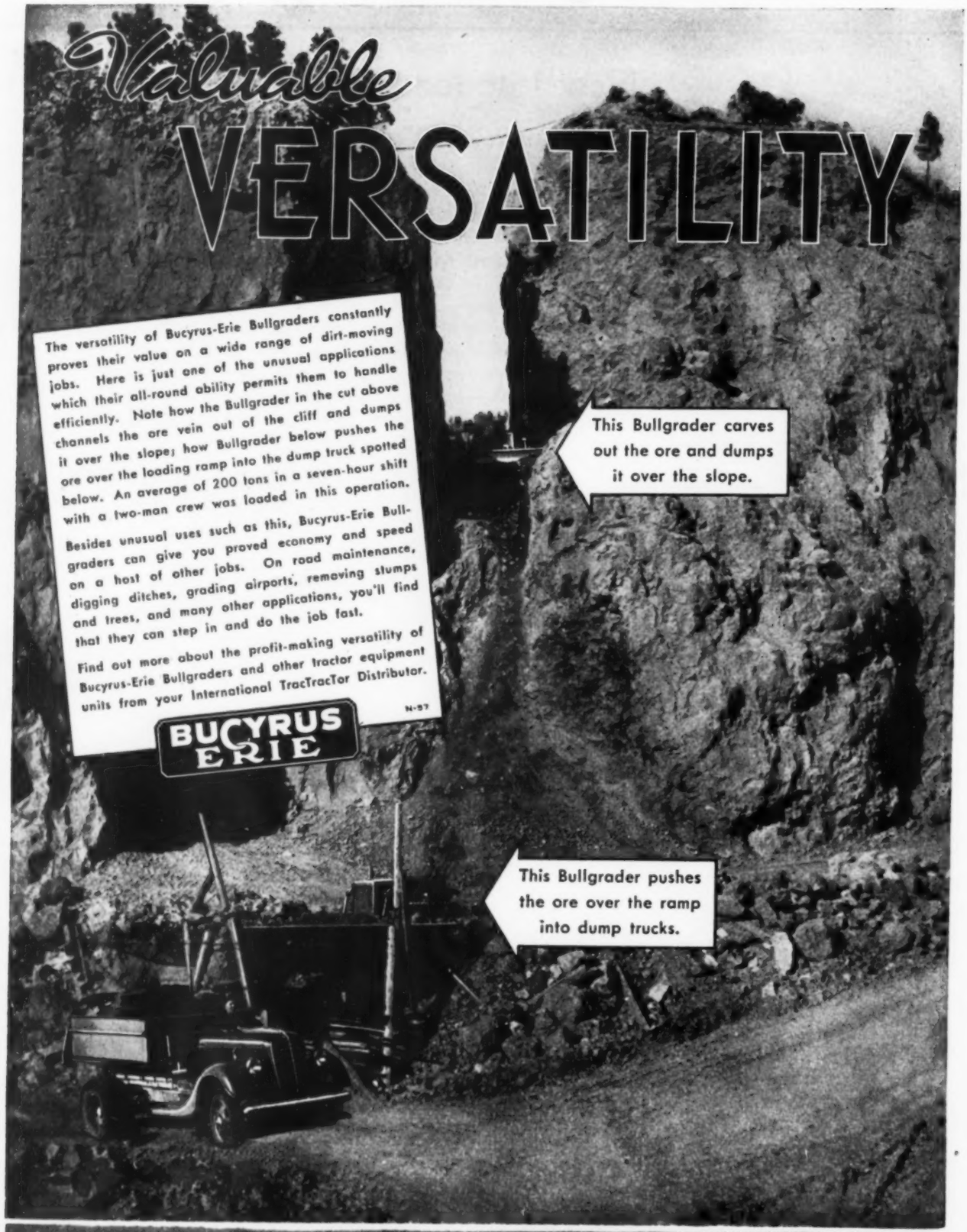
New Life for 350,000 more Americans

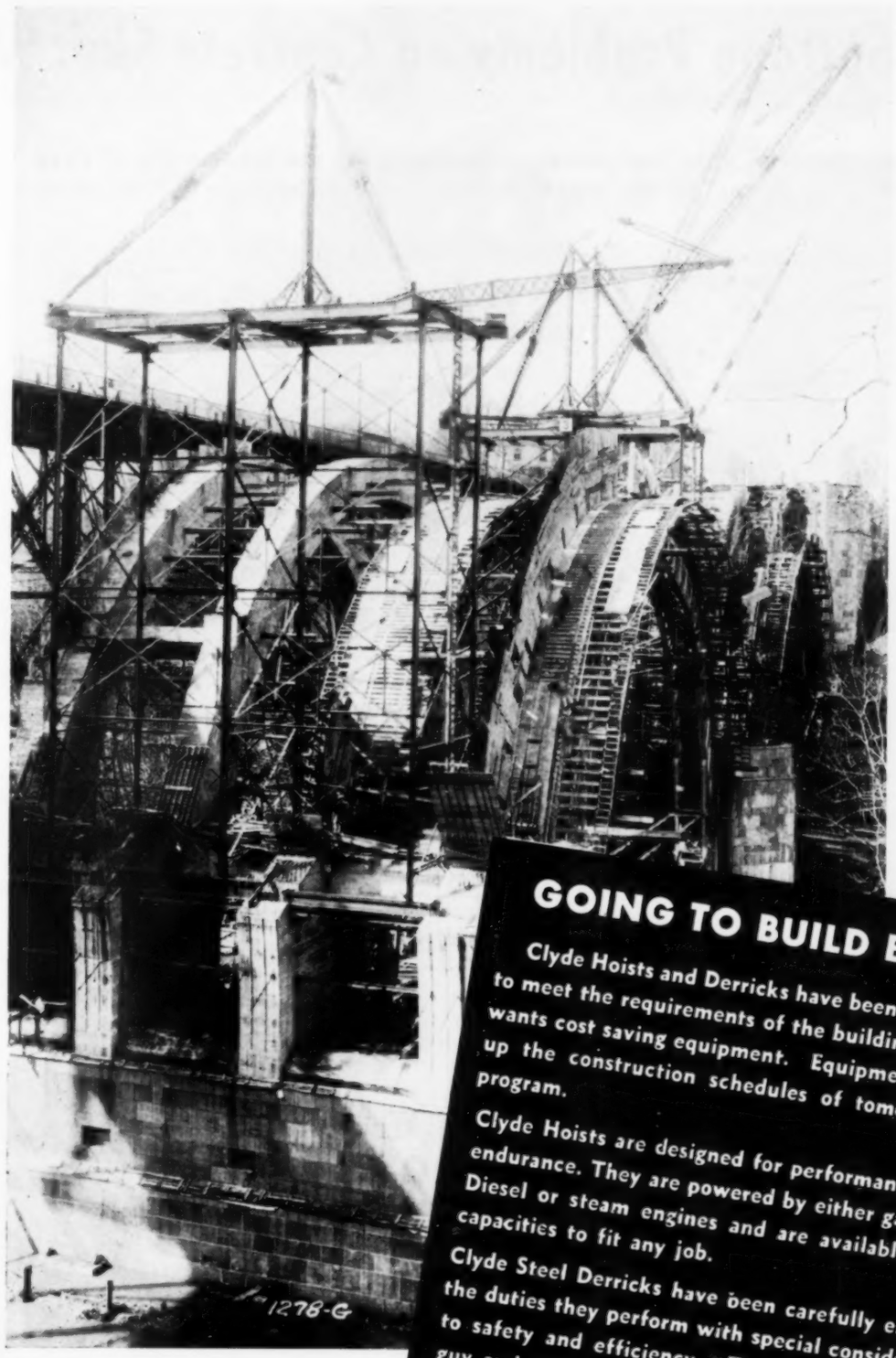
New power for new farms, new industries, villages and cities, water for more than a million thirsty acres—all this is made possible by 15,000,000 yards of aggregates which are the basic ingredients of mammoth Grand Coulee Dam. Even more fundamental, specially where the contractor is concerned, is the cost of producing aggregates for dams like this, or for highways, airports, industrial or residential building. The difference of even a few cents a ton, on the cost of producing that aggregate, may mean the difference between profit and loss or between getting the contract or not getting it.

Tomorrow's construction projects hinge on low cost aggregates! IOWA, devoted exclusively to the manufacture of Cedarapids equipment, will be more than ever Headquarters for aggregate producing equipment for the boom periods that lie ahead.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA




Valuable
VERSATILITY
The versatility of Bucyrus-Erie Bullgraders constantly proves their value on a wide range of dirt-moving jobs. Here is just one of the unusual applications which their all-round ability permits them to handle efficiently. Note how the Bullgrader in the cut above channels the ore vein out of the cliff and dumps it over the slope; how Bullgrader below pushes the ore over the loading ramp into the dump truck spotted below. An average of 200 tons in a seven-hour shift with a two-man crew was loaded in this operation.
Besides unusual uses such as this, Bucyrus-Erie Bullgraders can give you proved economy and speed on a host of other jobs. On road maintenance, digging ditches, grading airports, removing stumps and trees, and many other applications, you'll find that they can step in and do the job fast.
Find out more about the profit-making versatility of Bucyrus-Erie Bullgraders and other tractor equipment units from your International TracTracTor Distributor.
N-57
BUCYRUS ERIE
This Bullgrader carves out the ore and dumps it over the slope.
This Bullgrader pushes the ore over the ramp into dump trucks.
BUCYRUS ERIE TRACTOR EQUIPMENT
SEE YOUR
INTERNATIONAL TRACTRACTOR
DISTRIBUTOR



Plan now for the job you'll do tomorrow!

GOING TO BUILD BRIDGES?

Clyde Hoists and Derricks have been specially designed to meet the requirements of the building contractor who wants cost saving equipment. Equipment that will step-up the construction schedules of tomorrow's building program.

Clyde Hoists are designed for performance and built for endurance. They are powered by either gasoline, electric, Diesel or steam engines and are available in sizes and capacities to fit any job.

Clyde Steel Derricks have been carefully engineered for the duties they perform with special consideration given to safety and efficiency. They are available in either guy and stiff leg types in all practical sizes.

Bulletins on every type of Clyde Equipment are yours for the asking. Check their features . . . compare their quality.

CLYDE

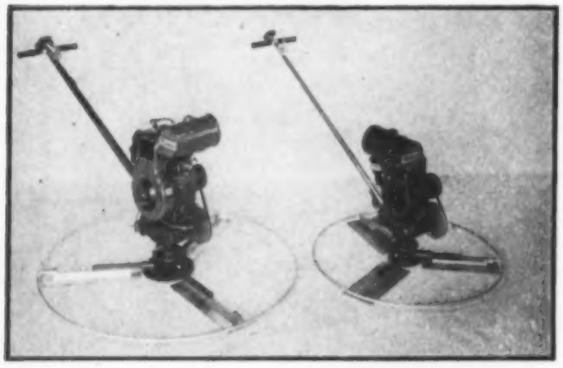
CLYDE IRON WORKS, INC.

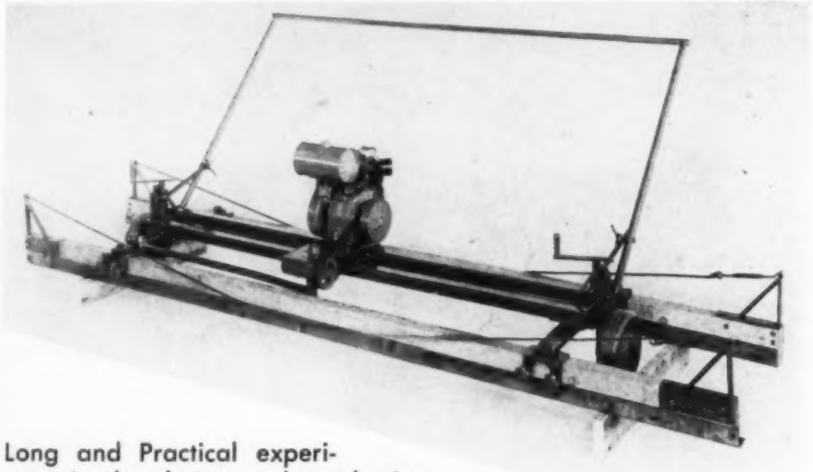
DULUTH, 1 MINNESOTA

Whiteman "ONE-MAN" Machines Solve Labor Shortage Problems on Concrete Slab Work

Whiteman Machines conserve your manpower — multiply the work capacity of even "green" hands — the machines do the work. Better concrete slabs in 2/3 the time.

Below—WHITEMAN DUAL PURPOSE FINISHING MACHINES. The Model "B" with 46" trowel diameter for larger jobs, and the new Model "J" small diameter lightweight finisher, designed for smaller contractors and industrial maintenance work.

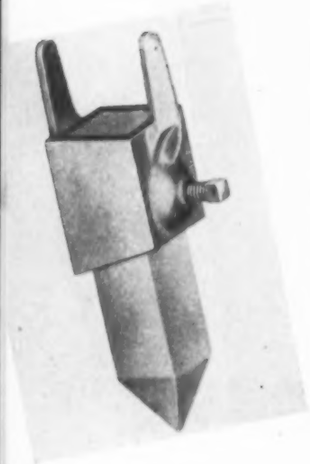




Long and Practical experience in the design and production of concrete construction equipment enables us to present the improved Portable Rodding Machine of the Whiteman Line of Concrete Equipment.

It now comes equipped with wider frame, a new type of crank and Pittman arm drive, and adjustable screed stick truss for maintaining perfect level on concrete slab work. The transverse action of the two screed sticks vibrates, thoroughly compacts and puddles the slab, permitting the use of very low slump concrete. The resulting finish is smooth and free from riffles and depressions, ready for floating or, if desired, final smooth finish with Whiteman Dual Purpose Finishing Machine, which is shown at left in the two available sizes. Recommended for slab widths up to twenty feet.

WHITEMAN SCREED STAKE CAPS save time and labor. You can make up your own 2x2" wood stakes on the job, cutting them to lengths needed to fit ground conditions. Drive the stakes and then adjust the tough, malleable iron cap to the proper level. Screeds may be either 2½" pipe or 2x4s.



WHITEMAN HAND TAMPER for use on small work. A denser floor is obtained with more even distribution of finer aggregates, leaving a "fat" sufficient for finish. With a good mix, dry topping is unnecessary. This inexpensive, lightweight, adjustable and collapsible Tamper will save much time on small work.

WHITEMAN ADJUSTABLE SCREED STAKE — a new all-metal ADJUSTABLE screed stake that minimizes time for screed header placement in any soil. The pin (available in 9" and 12" lengths) is set in the ground; then horizontal ground bar is placed firmly on the ground and locked with set screw; final grade is obtained by sliding head up or down. Entire stake is easily reclaimed.

WRITE OR WIRE TODAY FOR NAME OF OUR DISTRIBUTOR NEAREST TO YOU

Whiteman MANUFACTURING CO.

249 Casitas Avenue — Los Angeles 26, California

Right down the Line

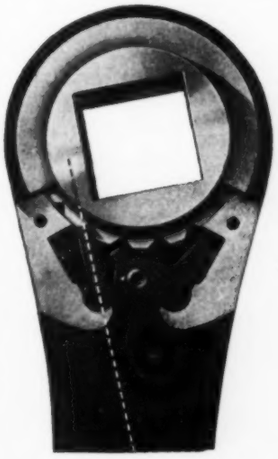
LOWELL
RED RATCHET WRENCHES
Prove their Worth

That SPEED and SAFETY are needed in Tunnel Work, Electric Tower Erection and in SHIPBUILDING, to-day, is an axiom. Heavy constructors doing a great variety of work need the best tools to complete jobs on time. So you encounter LOWELL Red Ratchet Wrenches on a wide diversity of heavy construction — evidence that successful contractors think alike about essentials.

Until the War is over, distributors' stocks may be short of LOWELL WRENCHES. In the meantime, note them down for your first Post-War orders.

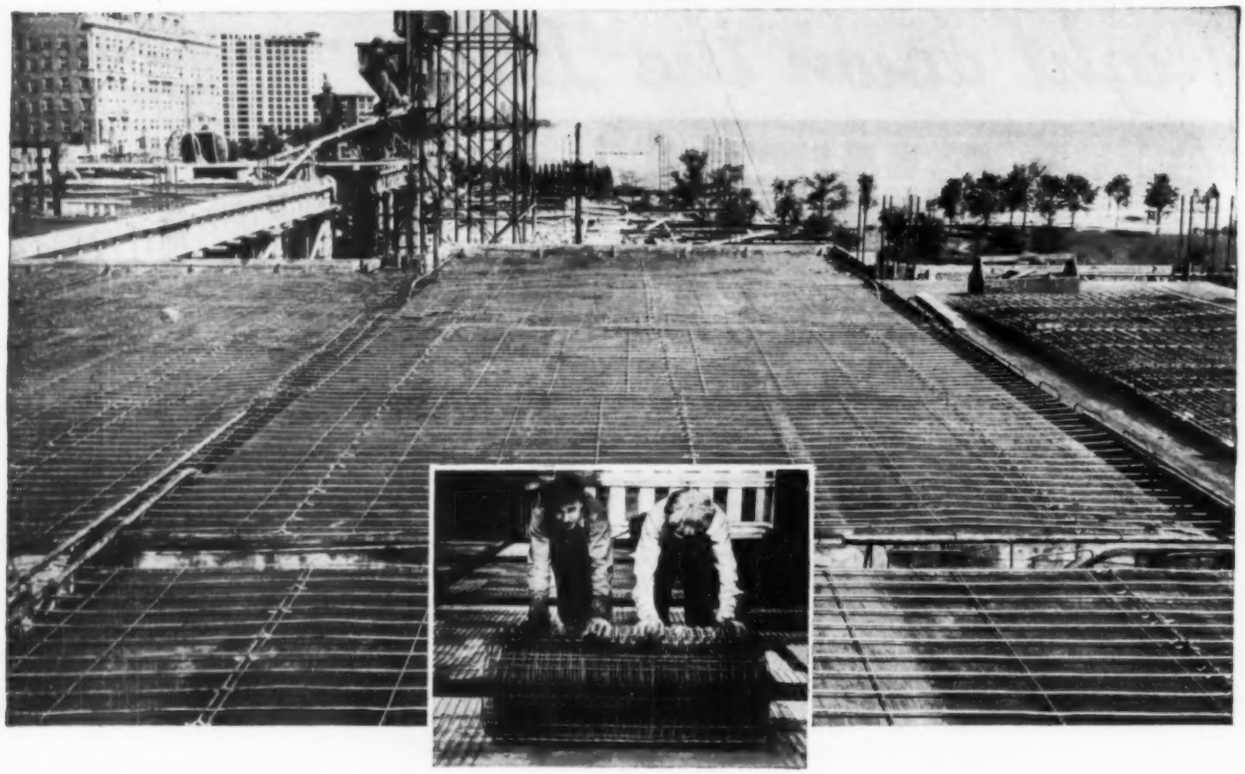
Straight Line LEVERAGE!

See how each pawl, when engaged, transmits leverage from the solid stock of the handle, direct to the gear in a *straight line* and with a square contact. The pawl is in compression only — no shear, no tension, no torsion. The shipper carries none of the load. This strong construction insures steady service.



LOWELL WRENCH CO.
WORCESTER 8, MASS.

1869 1944



For all concrete construction

. . . WIRE FABRIC REINFORCEMENT

MILLIONS of square feet of American Welded Wire Fabric have been used as reinforcement in prominent buildings all over the country. Because its adaptability to countless uses in concrete construction has been proved conclusively, because it is so practical, so convenient, so economical, it has won wide acceptance among architects and engineers.

Wire fabric is the preferred reinforcement because it enables the concrete slab to withstand impact, stresses and strains in every direction. Made of high yield-point cold-drawn steel, American Welded Wire Fabric is convenient to handle, is installed quickly and easily, lies flat and always stays in place. Think what those advantages mean in savings of construction time and costs.

We shall be glad to consult with you on reinforcement problems and to send you detailed information on the many and varied uses of American Welded Wire Fabric. Drop us a line today, without obligation.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

AMERICAN WELDED WIRE FABRIC

UNITED STATES STEEL

A TOUGH MACHINE FOR ROUGH COUNTRY

LATEST MODEL T-6-K MICHIGAN

A sudden slide — and a vital California mountain highway was blocked by 100 tons of rock. This veteran ⅜ yard MICHIGAN Shovel sped to the job. Minutes later, traffic resumed... Highway maintenance is important war work — and Michigan Shovels and Cranes are proving themselves even more than ever before.

⅝ yd. and ½ yd. models. Convertible to Shovel, Crane, Clam, Dragline, Trench Hoe. Write for Bulletin CM-64.

MICHIGAN

POWER SHOVEL COMPANY

BENTON HARBOR MICHIGAN

You'll find 'em with the Seabees, with the U. S. Engineers, at home and on the fighting fronts. Our meeting of their needs first is why your Goodyear dealer may be temporarily out of tires.

You'll find them in camp jobs, road jobs, dam jobs—every kind of job where the going's tough and tires have to be tougher.

And Goodyear O-T-R's (Off-The-Roads) got there by *delivering in the pinches!* And they *can* deliver.

Because—Goodyear brought to the building of these special tires knowledge gained in producing 350,000,000 pneumatic casings.

Because—Goodyear alone could give 'em a husky carcass of low stretch Supertwist cord, armored with multiple-compounded rubber that makes tires tougher, longer-wearing.

Because—they've got treads that *pull through*, put there by Goodyear designing skill which gives you the kind of traction you need; road grip that means speed, power, and sure-footed going. And they've got *long-life* treads, specially compounded to resist cuts and snags.

Take the tip of fellows you know—let The Greatest Name in Rubber be your guide when you have got a big job to do with your scrapers or other construction equipment, and *have* to be right:

Better get Goodyears!

*** THEY GO WHERE ROADS DON'T**

Here are the Big Three of the Off-The-Roaders, Goodyear huskies with multiple-compound construction on low stretch Supertwist carcass. Three tread patterns cover all off-the-road use.

Supertwist, Sure-Grip, All-Weather—T.M.'s
The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 26 JUNE, 1944 Number 6

Press Association Photo

CHINESE LABORERS USING PRIMITIVE METHODS BUILD ARMY AIRFIELDS

CHINA AIRBASES are built by 300,000 conscripted Chinese laborers working under Chinese and American Army engineers. Shortage of modern equipment necessitates use of primitive methods. Here continuous stream of native workers carry rocks for runway roadbed in buckets, baskets, wheelbarrows and carts.

OTHER PICTURES OF CHINESE AIRPORT CONSTRUCTION APPEAR ELSEWHERE IN THIS ISSUE.

DRAGLINE BUCKET provides shower bath for LIEUT. ARTHUR S. CARTER, U. S. Marine Corps, in Cape Gloucester, New Britain, battle area.
Press Association Photo

TEMPORARY BRIDGE across Mussolini Canal is built by Allied forces to replace wrecked structure at right. Crossing forms part of supply line on southern Italian sector.
Press Association Photo

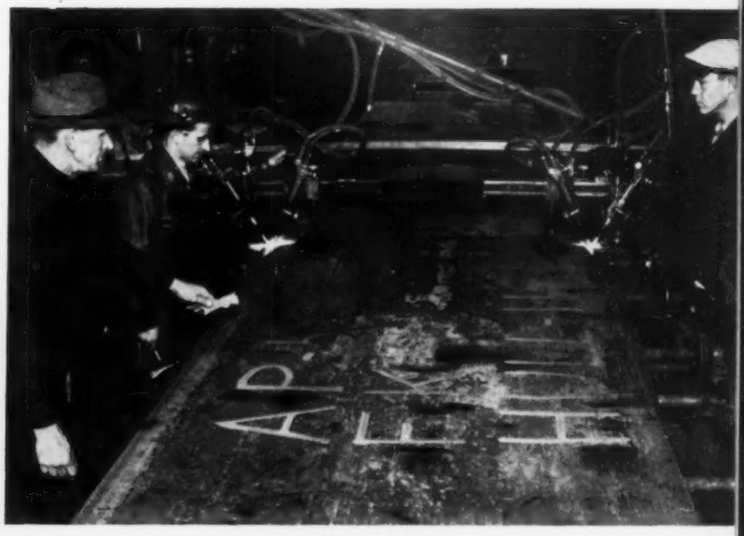
DELAWARE RIVER AQUEDUCT, to serve City of New York, goes into service, as MAYOR FIORELLO H. LAGUARDIA (above) opens sluice gate to divert 50 mgd. flow from Roundout Creek into 85-mi. tunnel feeding city's reservoirs. Participating in opening ceremonies are (left to right): COMMISSIONER PATRICK QUILTY, Department of Water Supply, Gas and Electricity; ROGER W. ARMSTRONG, deputy chief engineer, Board of Water Supply; MAYOR LAGUARDIA; GEORGE J. GILLESPIE, president, Board of Water Supply; and JOSEPH D. McGOLDRICK, city comptroiler.

STANDARD CONSTRUCTION EQUIPMENT (below) of type commonly employed on earth-moving and road grading projects is here pictured in different role. Operated by crew of U. S. Marines, this International tractor is hauling "Long Tom" or 155-mm. gun through jungle mud somewhere in South Pacific war theater.
U. S. Marine Corps Photo

THIS MONTH'S NEWS REEL

LARGE PENSTOCKS, through which California's Sacramento River will be partially diverted to drive turbines in powerhouse below Shasta Dam, are cleaned preparatory to painting. Power plant of U. S. Bureau of Reclamation's Central Valley project is scheduled to begin production this year, with 15-ft. penstocks serving five 75,000 kw. generators.

U. S. HOUSE ROADS COMMITTEE HEARINGS (below) on post-war highway bill are interrupted by visit of MAJOR WILBURN C. CARTWRIGHT, former committee chairman, who is recuperating from injuries received in Italy. Left to right are: Representatives A. L. GOODWIN of Massachusetts and J. W. ROBINSON of Utah, Roads Committee chairman; CHARLES M. UPHAM, engineer-director, American Road Builders' Association; MAJOR CARTWRIGHT; and Representative JESSE P. WOLCOTT of Michigan, ranking minority member of committee.



CANOL LINE SECTION (below) is laid and welded on Alaska Highway south of Northway Junction. Pipeline, which is 600-mi. long, will carry oil from Fort Norman oil fields in Canada.

Herbert C. Lanks Photo from European

FIRST KEEL BOTTOMS (right) for AP-5 ship, first of 36 troop transport vessels, are cut in plate shop of Oregon Shipbuilding Corp. at Portland, Ore. Exterior of hull will be basically same as for cargo ships. Major changes will come from conversion of cargo space into quarters for armed personnel.

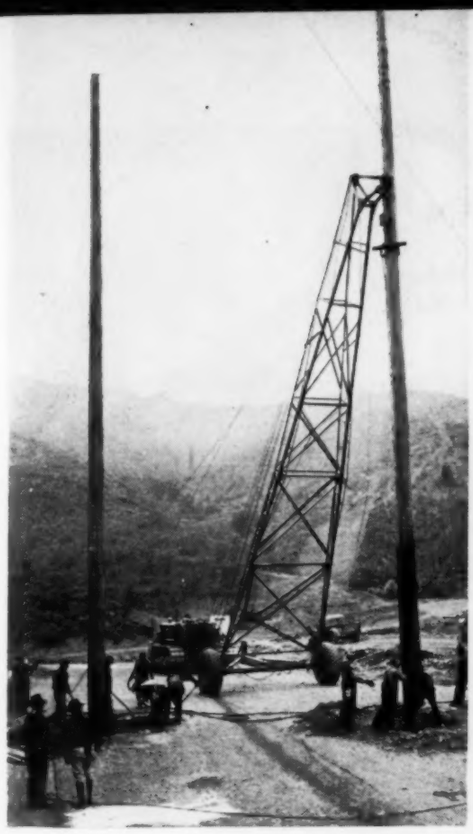
"TARAWA LUMBER CO." (below) is operated by U. S. Navy, using sawmill imported to Tarawa to resaw large dimension lumber into needed sizes. Here it works on cocoanut logs, making lumber good enough for tent frames, flooring and uses for which other lumber cannot be spared.

Acme Photo

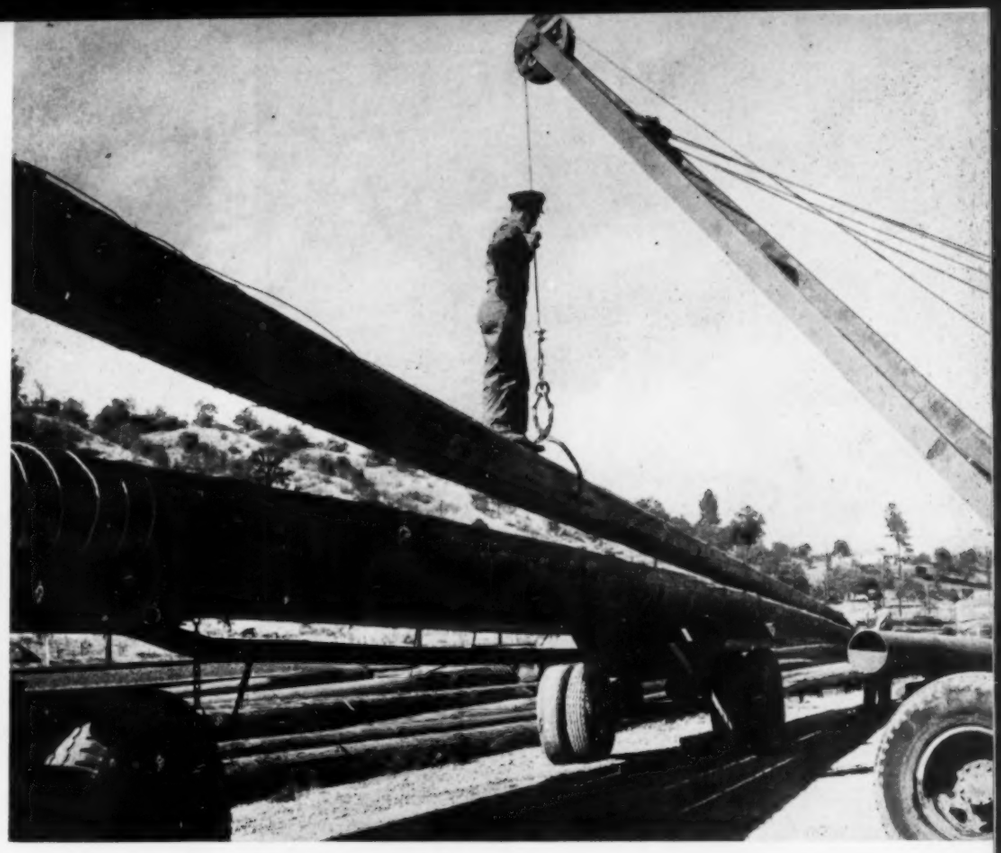
WOOD POLE ERECTION

For 100-Mile Transmission Line Handled by Tractor-Crane Rig

ERECTION OF TWO-POLE TRANSMISSION LINE support is handled by Le Tourneau long-boom welded tubular crane with 50-ft. boom mounted on pair of pneumatic-tired wheels and operated by power takeoff on rear of Caterpillar tractor.



FOR THREE-POLE SUPPORT poles are erected individually by tractor-crane. Here pole is just about to be lowered into foundation pit. Wood preservative has been applied to butt end.



LONG WOOD POLES, measuring 90 ft. overall, are loaded on to truck-trailer at storage yard near Redding, Calif., for delivery to points of erection on 100 mi. transmission line. Note electric ground cables installed on butts of poles before being shipped to job. This length pole is used for utility crossings and where unusual topographical conditions require tall structure.

ONE OF THE HIGHEST VOLTAGE transmission lines ever placed on wood poles is being erected between Shasta Dam, on the Sacramento River about 12 mi. north of Redding, Calif., and Oroville, Calif., 100 mi. to the south. The line is designed to operate at 230,000 v. and has a nominal capacity of 150,000 kw. It is being built by the United States Bureau of Reclamation and is a part of the transmission system to distribute Central Valley Project power throughout central and northern California.

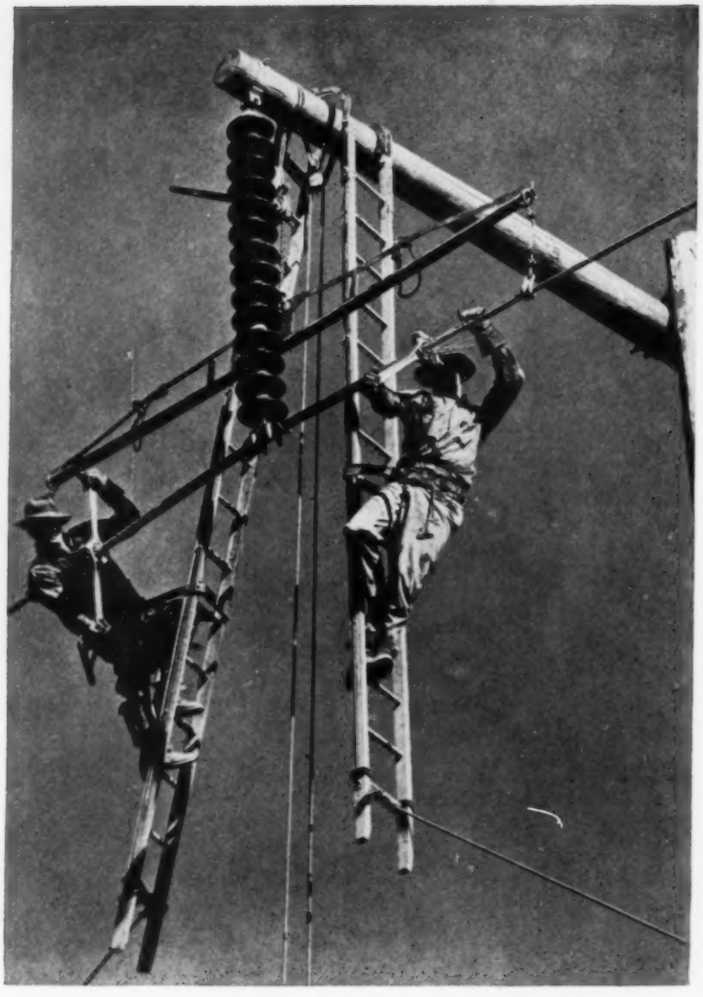
By congressional direction the Bureau of Reclamation is constructing the line to connect with the existing transmission system of a private utility at Shasta substation near Anderson and at Oroville. The line is of sufficient capacity to transmit the output of two of the 75,000-kw. generators in the Shasta power plant.

The line is being built by the Larson Construction Co. of Denver, Colo., for a competitive bid price of $248,841 and within a specific time limit of 170 days. It is a single-circuit system and operates at 60 cycles. The structures are of a wood-pole, H-frame type. The poles vary in length from 45 to 110 ft. The 85- and 90-ft. poles are used for utility crossings and where unusual topographical conditions require a tall structure to maintain minimum ground clearance for the conductor. The 110-ft. poles are used in the terminal structure at the Oroville end of the line. Poles 45 ft. in length are set 4½ ft. in rock and 6½ ft. in earth; for the 90-ft. poles the depths of settings range upward to 9 ft. in rock and 11 ft. in earth. At angle and dead-end points and at other points of unbalanced stress, poles of extra large diameter are set 6 in. deeper than for normal conditions. Where poles are set partly in earth and partly in rock they are placed as if in earth.

As illustrated in the accompanying photographs pole erec-

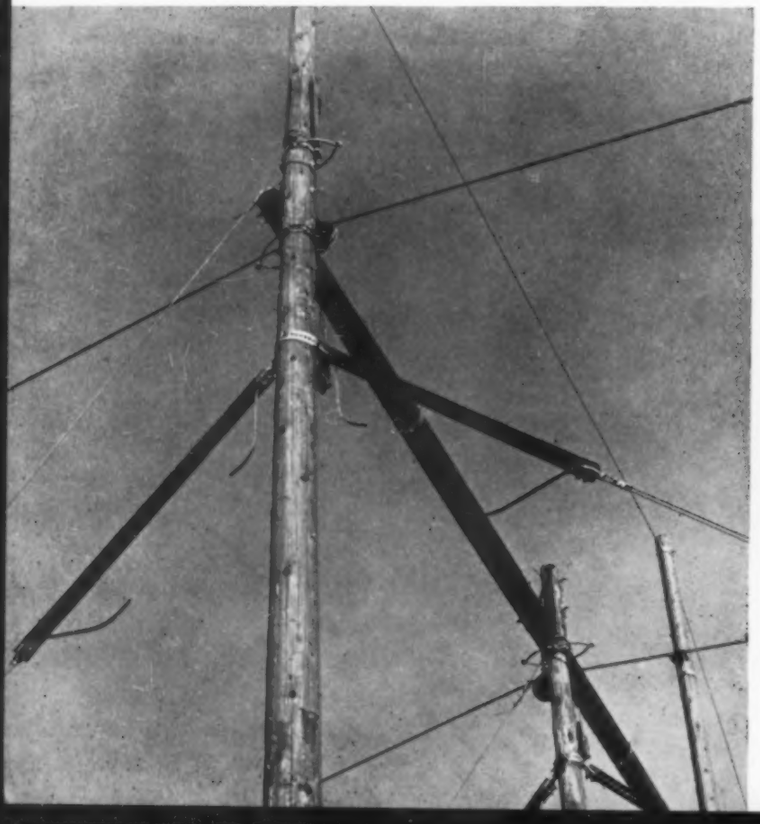
AFTER POLE IS SET in foundation pit (below) it is first plumbed by workers (left) and then backfill is placed and consolidated (right) by pneumatic tamper.

AT SWITCHYARD on east side of Sacramento River opposite Shasta power plant, riggers erect steel tower structure for transmission system.



LINEMEN, working from hanging ladders on cross-arm, install armor rod on Shasta-Oroville transmission line.

U. S. Bureau of Reclamation Photos



COMPLETED THREE-POLE STRUCTURE (left) is here shown with two of conductors supported on pulleys used for stringing.

CONNECTION (above) between pole and cross-arm is made on ground with metal clamp and bolts. Cross-arm is wooden.

BY FIELD TELEPHONE SYSTEM (left) cable-stringing was at all times under control of contractor.

ALTHOUGH NOT TYPICAL, some pole holes for transmission line presented difficulties. Here worker is digging in cemented gravel.

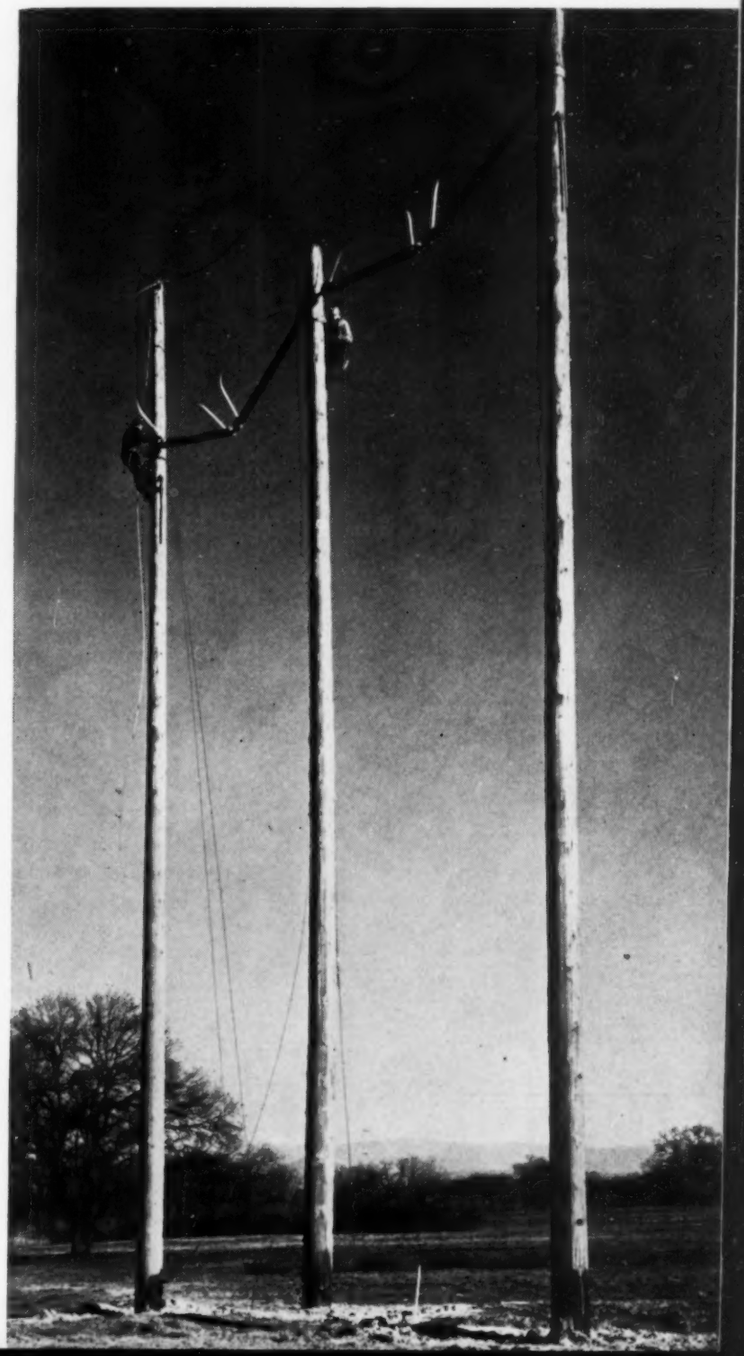
tion was handled by a LeTourneau tractor-crane equipped with a 50-ft. boom of welded tubular construction. The equipment used to erect structural steel in the switchyard was a truck-mounted crane with two pole extensions to the boom, giving it an overall length of 85 ft.

Of the line extending from the switchyard at the Shasta power plant 4½ mi. are designed for California heavy loading of ½ in. of ice and a wind pressure of 6 lb. per sq. ft. at 0 deg. F. The remainder of the line to Oroville is designed for California light loading of no ice and a wind pressure of 8 lb. per sq. ft. at 25 deg. F. The conductors for the line are 795,000 circular mil, aluminum conductors, steel reinforced. The outside diameter of the conductor is 1.108 in.

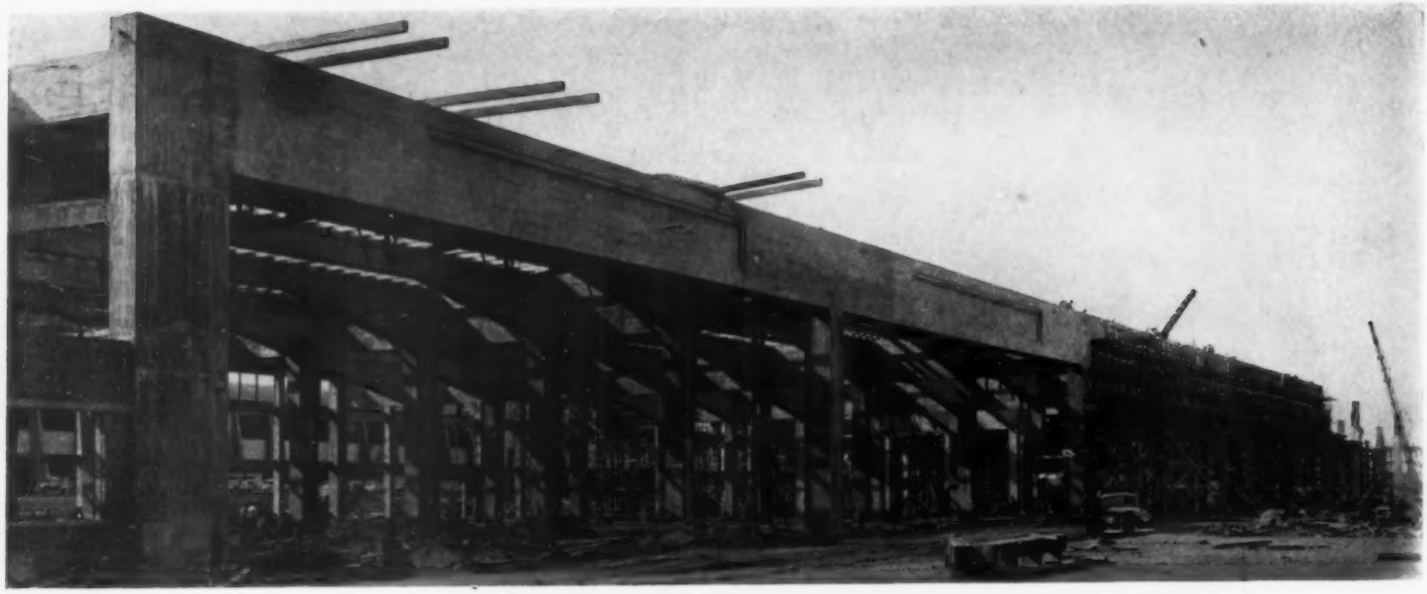
The conductor is strung with a ruling span of 700 ft. so that under heavy loading conditions the maximum tension on the conductors will be 9,000 lb. or approximately 29 percent of the ultimate strength of the conductors. Under light loading conditions the maximum tension in the conductors will be 7,500 lb. or about 22 percent of the ultimate strength of the conductors. The line will contain 6 transpositions. Wood, spare-type cross-arms are used for supporting the insulators and conductors. Except where specified the construction and clearances of the line conform to the "Rules for overhead line construction, General Order 95" prescribed by the Railroad Commission of California. All material becoming a permanent part of the line is furnished by the Government.

Construction of the transmission line is under the direction of Charles E. Carey, regional director for the U. S. Bureau of Reclamation.

GUY CLAMP (above) is attached to pole. Poles for this transmission line vary in length from 45 to 110 ft.



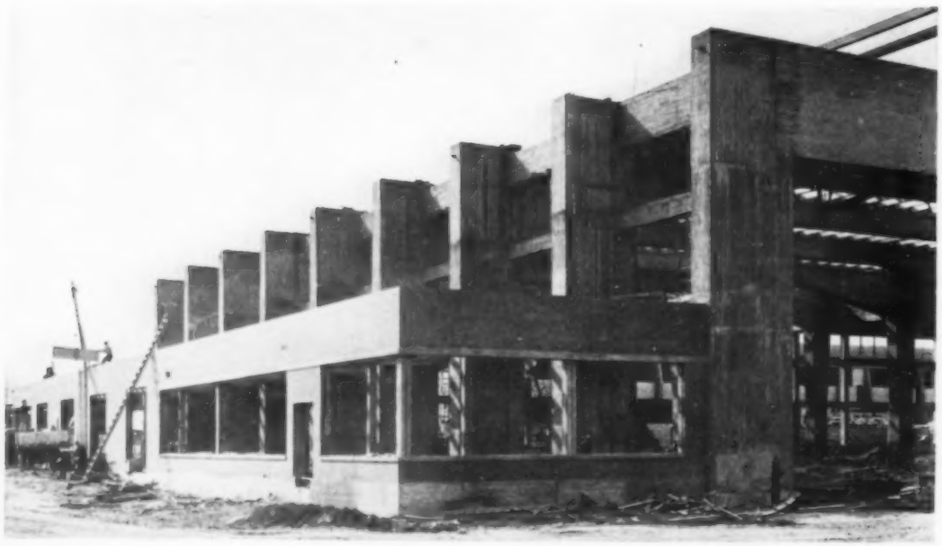
FRAMING OF THREE-POLE SUPPORT for transmission line (right) is in progress by workers equipped with safety belts.



CONCRETE GIRDERS span bays of 125 ft. at Curtiss-Wright flight hangar.

Flight Hangar of *Reinforced Concrete* Saves Critical Materials

ONE-STORY SECTION is built at each end of hangar which will contain usual plant facilities, one for use of officers and other for auxiliary services.



FLIGHT HANGAR has a floor area of 180,000 sq. ft., comprising bays, each with clear span of 125 ft.

A MINIMUM OF CRITICAL MATERIAL is required in the large flight hangar built under U. S. Engineer Department direction at the Curtiss-Wright plant, Buffalo, N. Y. The reinforced concrete structure was designed to meet wartime restrictions at as reasonable cost as similar buildings in wood or steel. Materials readily available in the locality were utilized. Building is made up of bays having a span of 125 ft. and provides a working floor area of 180,000 sq. ft. Construction was completed in 120 days.

The hangar was designed by Duane Lyman & Associates, architects; James Gill & Thomas McKaig, structural engineers, with Prof. C. E. O'Rourke of Cornell University as consultant; Beeman & Candee, heating and ventilating engineers; and Nusbaum & Clarke, civil engineers, all of Buffalo. General contractors were Poirier & McLane Corp., of New York City.

Welded Structures OF VARIED TYPES INDICATE WIDE RANGE OF POST-WAR USES

DIVERSIFIED APPLICATION of electric arc-welding to practically any type of steel construction is indicated by the accompanying photos from the Lincoln Electric Co., illustrating structures fabricated by the Pittsburgh-Des Moines Steel Co. They exemplify the wide application of the process for projects adaptable to peacetime purposes.

Fig. 1 shows an all-welded steel swimming pool at Red Wing Scout Camp near Butler, Pa., which will be in use only during the summer months. Because it is far from any authorized maintenance organization, it was made of steel so that it will be durable and usable with little care.

Fig. 2 shows one of three all-welded storage spheres for liquefied natural gas which is kept at a temperature of —258 deg. F. These structures, located at the plant of the East Ohio Gas Co. in Cleveland, are interesting because the inner sphere was welded of a special alloy steel, using a shielded-arc electrode specially designed for welding various stainless steels. This procedure enabled the building contractors to guarantee that the containers could be kept at extremely low temperatures without fear of fracture. Ordinary steel at —258 deg. F. breaks like glass when dropped. After the war liquid natural gas may be shipped in tank cars, barges and ships, thus making this important fuel available in many additional areas.

Fig. 3 shows an all-welded bus garage at Des Moines, Ia., of extremely light construction and, at the same time, providing a wide truss width, permitting a large, unobstructed repair area underneath without vertical support.

Fig. 4 shows what is known in the petroleum industry as a "vertical bullet" used for the storage of highly volatile gases, such as casing head fuel, under pressure. Increased use of high octane gasolines after the war may cause a growth in this type of fabrication.

Fig. 5 shows a rigid-frame all-welded steel building housing a plant now playing a vital part in the war effort. Manufacturing processes involve high temperatures and strong acids and the builder found that welded fabrication would materially reduce his maintenance and give him a factor of safety in the building. Furthermore, the completed job cost substantially less than bids for other types of conventional structures indicated. The tree form rigid-frame design also is somewhat unusual because straight line intersections were used rather than curved forms.

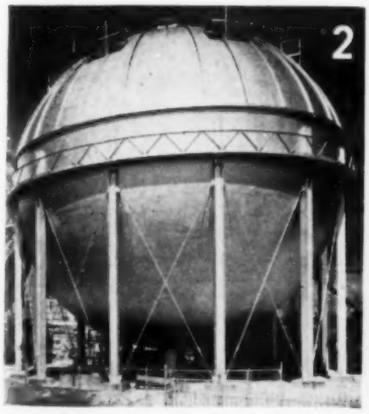
1 WELDED STEEL SWIMMING POOL is designed for low maintenance costs. Far from any authorized maintenance organization, it will be durable and usable with little care.

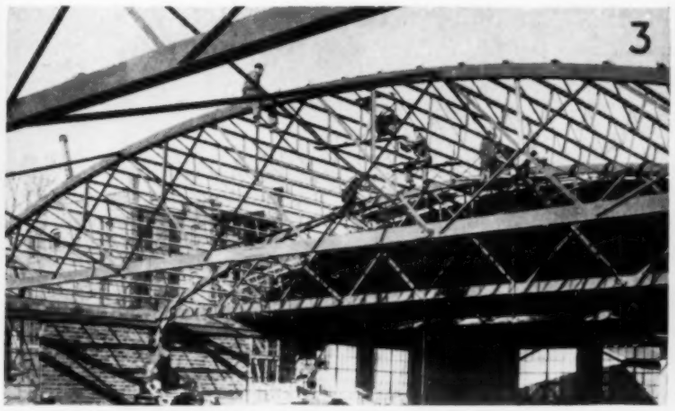
5 WELDED DESIGN permits exceptional rigidity in this structure for de-tinning plant.

2 ALL-WELDED SPHERE (below) stores gas at temperature of —258 deg. Inner sphere is welded of special alloy steel.

3 LIGHT CONSTRUCTION (below) and wide truss width feature this arc-welded framework for a commercial garage.

4 "VERTICAL BULLET" (right) built by arc-welding, stores highly volatile gases, such as casing head fuel.





RAILROAD VIADUCT is converted to highway section in Monroe County. I-beams are in place in slots in spandrel walls.

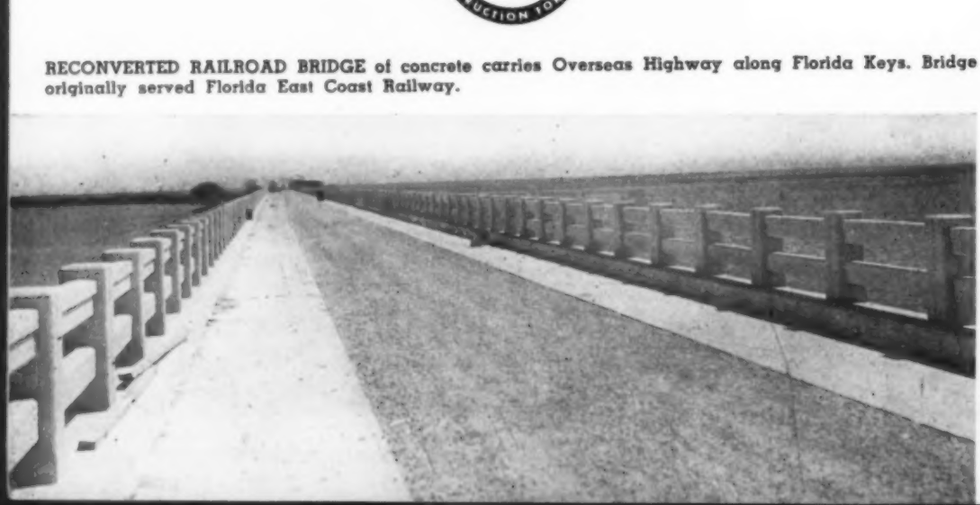
Overseas Highway

Along Florida Keys Revamped to Serve WAR TRAFFIC

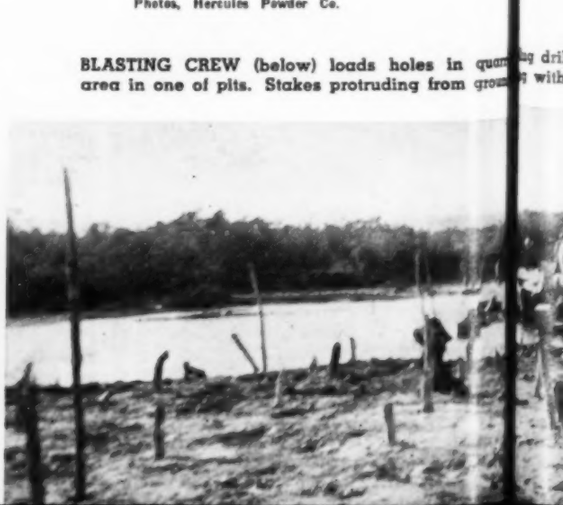
WAR ACTIVITIES, resulting in an influx of army and navy personnel and a rapidly expanded civilian population at Key West, Fla., have necessitated the relocation and reconstruction of portions of the Overseas Highway carrying traffic from the mainland to the southern tip of the Florida Keys. The new and improved 123-mi. route linking Florida City and Key West is 17 mi. shorter than the old roadway. The new construction, like those sections improved in 1938 follow along the abandoned right-of-way of the Florida East Coast Railway. (See CONSTRUCTION METHODS, July, 1939, p. 68, and Aug., 1939, p. 61). The latest reconstruction work has been done both by day labor by the Florida State Road Department, of which J. H. Dowling is chief engineer,

Photos, Hercules Powder Co.

RECONVERTED RAILROAD BRIDGE of concrete carries Overseas Highway along Florida Keys. Bridge originally served Florida East Coast Railway.



BLASTING CREW (below) loads holes in quar[illegible] dri[illegible] with area in one of pits. Stakes protruding from grou[illegible]



KEY MEN FOR CONTRACTOR include (left to right): CHARLIE WALKER, master mechanic; JIM SPATH, office; ART LEESE, office manager; ADOLPH LUNDIN, partner and project manager for Groves, Lundin & Cox; E. A. HANSON, equipment manager; KELLY BRINTON, traffic manager; and BOB CARROLL, paymaster.

DRAGLINE with 3-cu. yd. bucket excavates blasted coral rock from quarry area in Pit No. 6. As surface of pit was only foot above level of surrounding sea, rock broken in blast was quickly covered with water.

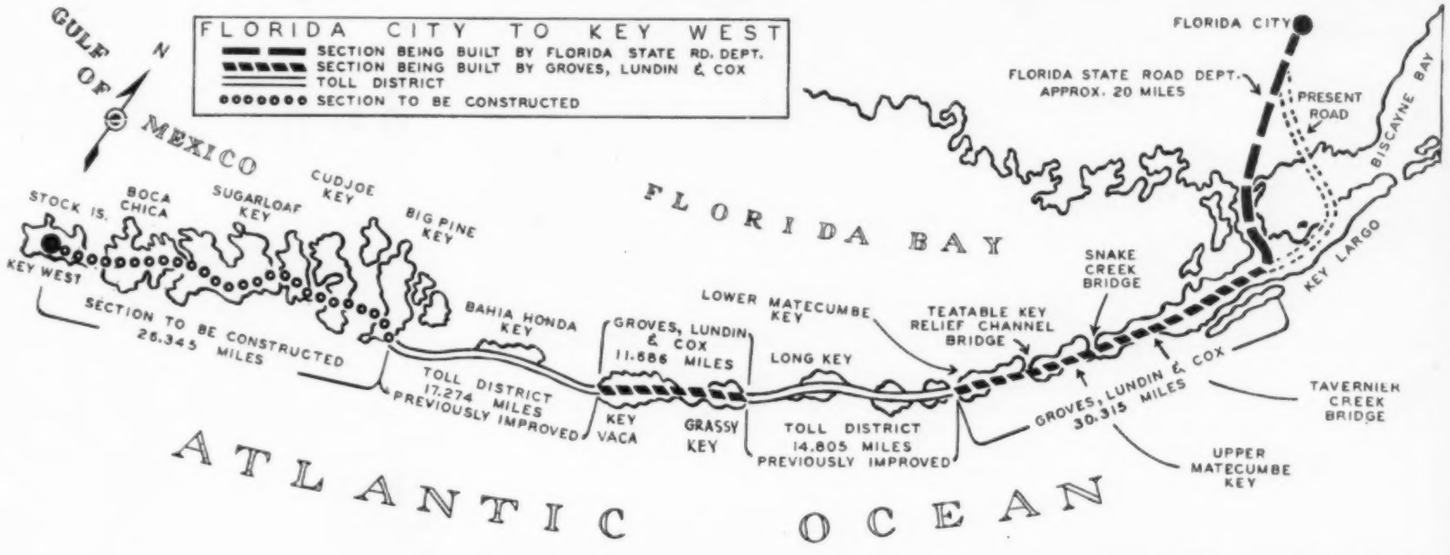
and under contract by Groves, Lundin & Cox, of Minneapolis, Minn. Because of the project's war importance, 75 percent of the costs are being borne by the federal government and 25 percent by the state. Surveys and studies were made by the state, in collaboration with the U. S. Public Roads Administration.

The work involves 89 mi. of new construction and improvement. When added to the 34 mi. improved 6 years ago, this will make the highway traveling distance 123 mi. instead of the previous 140 mi. The original highway utilized concrete

(*Continued on page* 120)

BLASTER loads water-covered holes in quarry floor with 60 percent nitroglycerin dynamite cartridges.

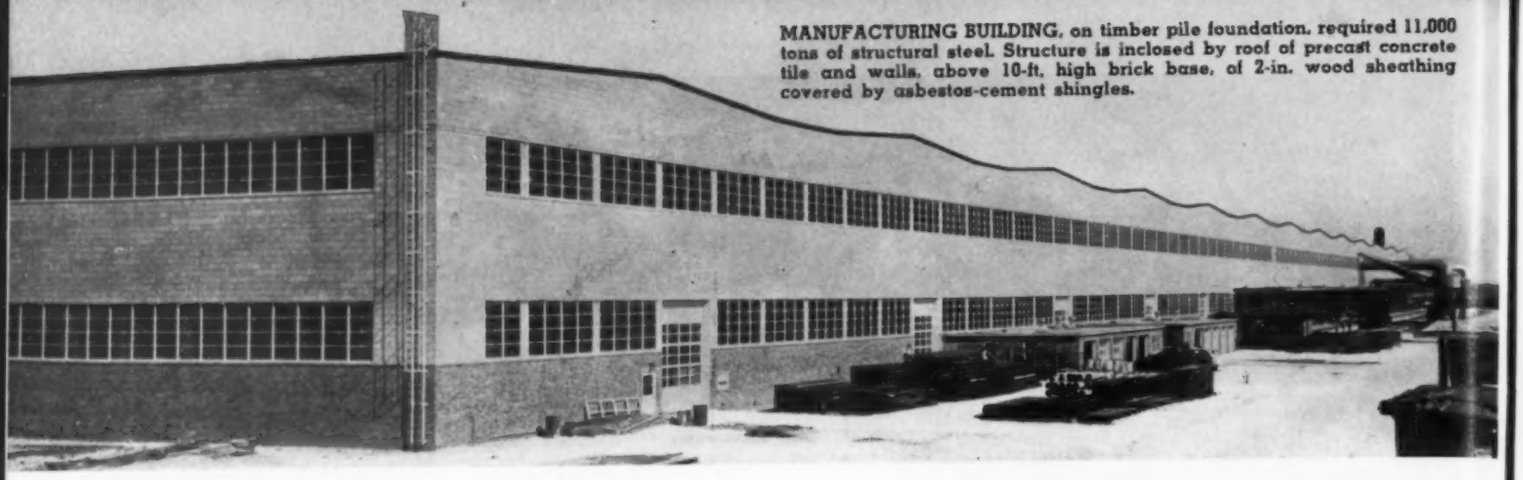
CORAL ROCK FROM STOCKPILE at pit is loaded by Lima shovel into truck for haul to fill.



LOCATION OF OVERSEAS HIGHWAY (above) showing sections recently reconstructed by day labor and by contract.

...ng drilled holes to keep them clean before loading with explosives.

GRADER AND BULLDOZER (below) spread coral rock to bring railway roadbed to required grade.



MANUFACTURING BUILDING, on timber pile foundation, required 11,000 tons of structural steel. Structure is inclosed by roof of precast concrete tile and walls, above 10-ft. high brick base, of 2-in. wood sheathing covered by asbestos-cement shingles.

AIRCRAFT PLANT CONSTRUCTORS

Whip Difficult Conditions

TO MEET FAST SCHEDULE

DIKE about 40 ft. wide, consisting of hydraulic fill material pumped from basin at left, separates fresh water pond for veneer logs, at right, from salt water in basin. Water level in pond is about 1½ ft. above that in basin. Note barge loads of shell brought into basin for unloading by derrick and cranes in background. Railroad track on dike is ballasted with shell.

CRAWLER CRANE, P. & H. unit (below), on steel hull at left unloads oyster and clam shells from barges to stockpiles for rehandling by smaller cranes into bins to fill trucks.

DIRECTING CONSTRUCTION on $22,000,000 aircraft plant, GEORGE E. HORR (right) is project manager for Turner-Raymond, contractors, NICHOLAS B. O'CONNELL (center) is operations manager, and ROBERT E. COPES is supervising engineer for Defense Plant Corp.

CYPRESS STUMPS encountered in excavation for chilled water reservoir of boiler house are typical of obstacles met in digging foundations and trenches. Wet muck between stumps is dug by hand. Varied assortment of pumps removes groundwater seepage from sumps.

CRAWLER DRAGLINE. Link-Belt-Speeder machine, swings timber mats into position before moving ahead on soft fill material. Note perforations in bucket for handling wet muck encountered in excavation operations.

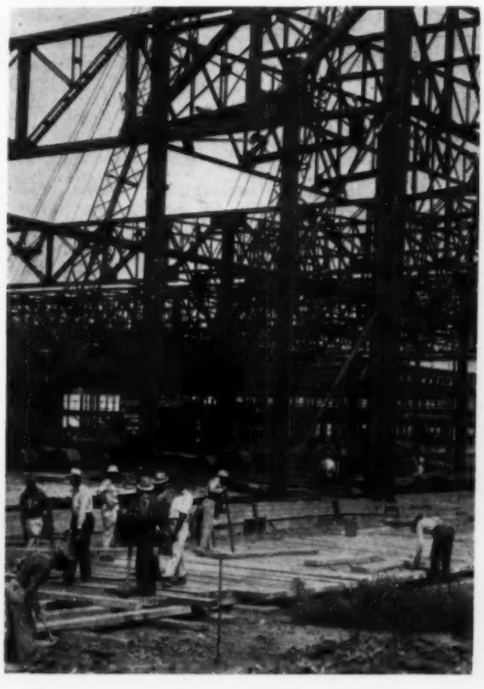
CONSTRUCTION HIGHLIGHTS
— OF —
HIGGINS AIRCRAFT PROJECT

- Huge main building
- 7,000,000 cu. yd. hydraulic fill
- 8,000 timber piles
- Design changes necessitated by lumber shortages
- 7 months' schedule for $22,000,000 project
- Plank roads and timber mats on soft fill
- Construction force of 5,000 workers
- Fleet of twelve 5-yd. truck-mixers.

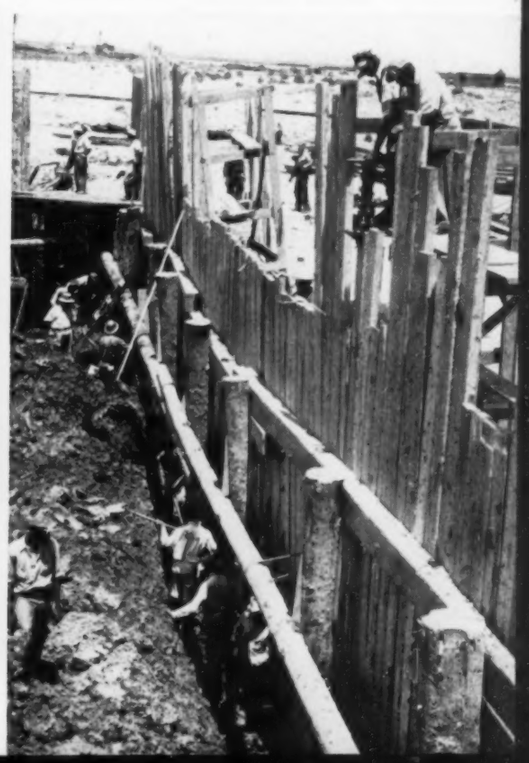
ON AN 1,100-ACRE SITE, about 14 mi. from the business center of New Orleans, a capable Turner-Raymond contractor team made up of the Turner Construction Co. and the Raymond Concrete Pile Co., has rushed to completion for the Defense Plant Corporation a huge industrial establishment including a manufacturing building, in which Higgins Aircraft, Inc., soon will be turning out planes for the Army Air Forces. Neither foundation difficulties on a marsh bottom, built up about 4 ft. above original grade by 7,000,000 cu. yd. of hydraulic fill, nor design changes to substitute other materials in place of wood, as required by WPB because of the lumber shortage, have retarded the contractors and Albert Kahn Associated Architects & Engineers, Inc., engineer-architects for the project,

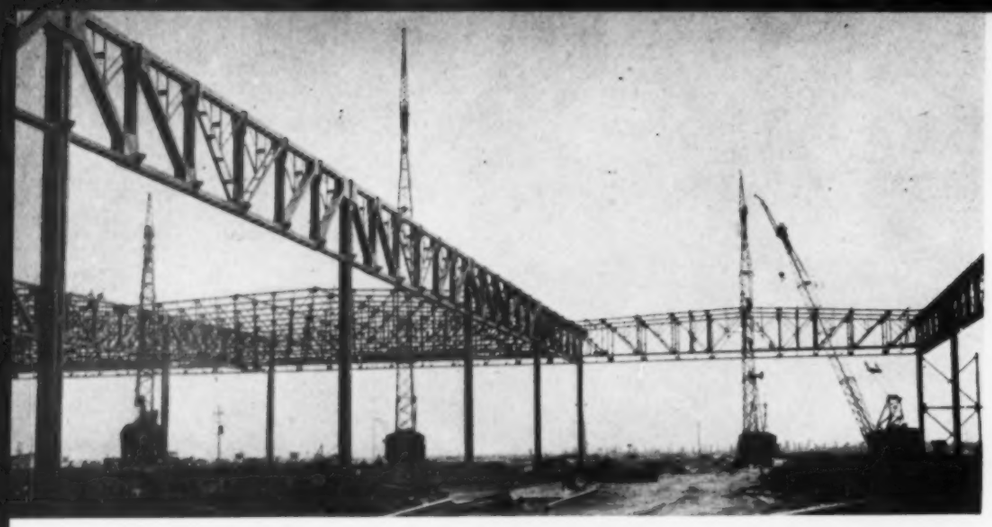
STEAM CRANE (below) equipped with steel leads drives creosoted piles for water tank at boiler house. Heavy Marion crane, operating single-acting steam hammer, rests on timber mats.

TEMPORARY PLANK ROAD (below) for hauling construction materials is laid on timber cribbing beside manufacturing building, in which cranes are erecting steel frame.



WOOD SHEETING (below) set between rangers of pile framing is driven to greater depth with air-powered sheeting hammers and holds sides of holes as laborers deepen excavation.



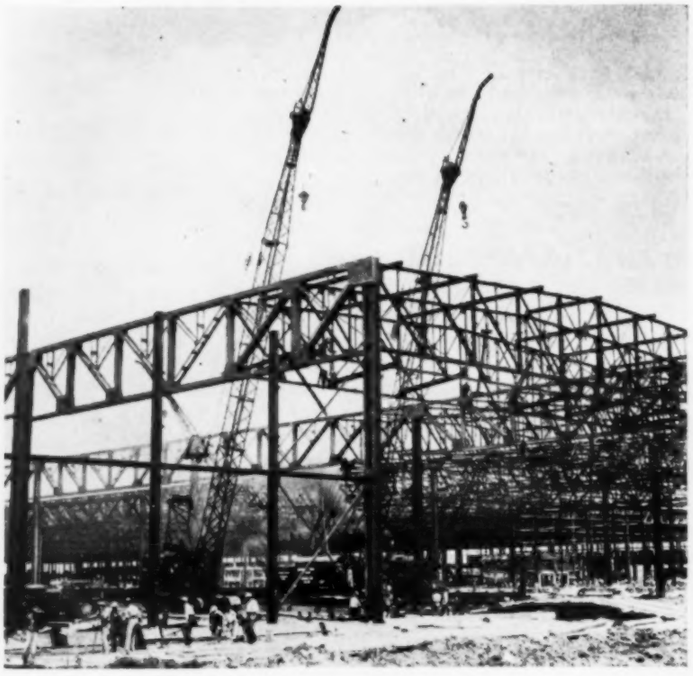


BETWEEN CARRIER TRUSSES spanning 105 ft. from column to column, erection cranes set 125-ft. roof trusses for assembly aisles in manufacturing building.

in pushing construction to meet a short schedule which set a time limit of less than 7 months for completion of the manufacturing building and other essential structures. Despite emphasis on speed, the plant is being completed at a cost only slightly exceeding the original DPC allocation of about $22,000,000.

Even after the site had been cleared of trees and built up with hydraulic fill, it presented no ideal condition for construction operations. The fill material was soft, and all temporary construction roads had to be planked solid on timber cribbing or stabilized by first placing a heavy fill of shell, which was used also for building permanent roads and ballasting railroad tracks on the site. When working in areas which had not been

ROOF TRUSSES of 125-ft. span are assembled and riveted in flat position on ground. After assembly, complete truss units are raised and set by two erection cranes.



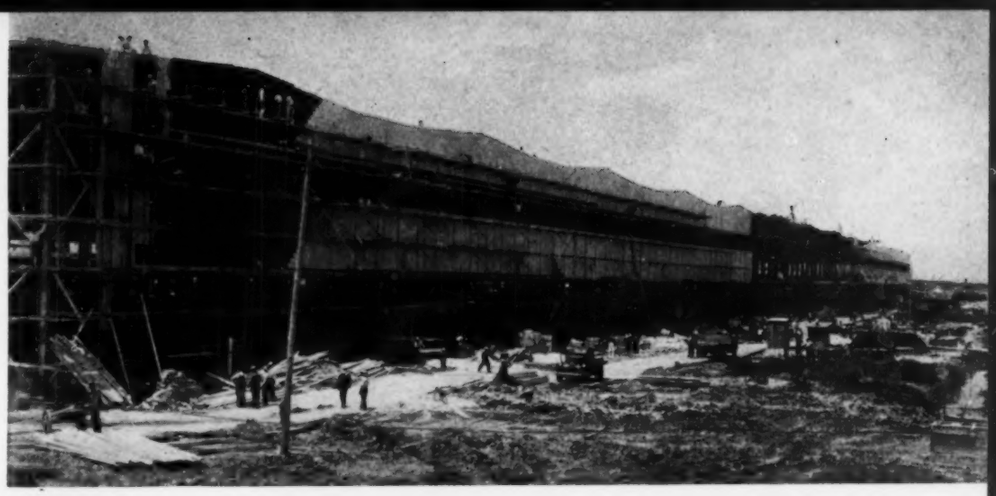
FILLING IN cross-bracing and purlins between trusses of roof framing. Northwest cranes handle light loads on 15-ft. jibs attached to 90-ft. booms.

HEAVY CARRIER TRUSSES (below) made up of 18-in. I-section members are assembled in vertical position with pinned and bolted connections and are lashed to column legs, ready for riveting. After being riveted, trusses are picked up by cranes and set on columns.

NOT ALL IS GRIEF to man in top charge of job for Defense Plant Corp., as indicated by this smile of GEORGE F. SHELLEY (below), senior engineer.

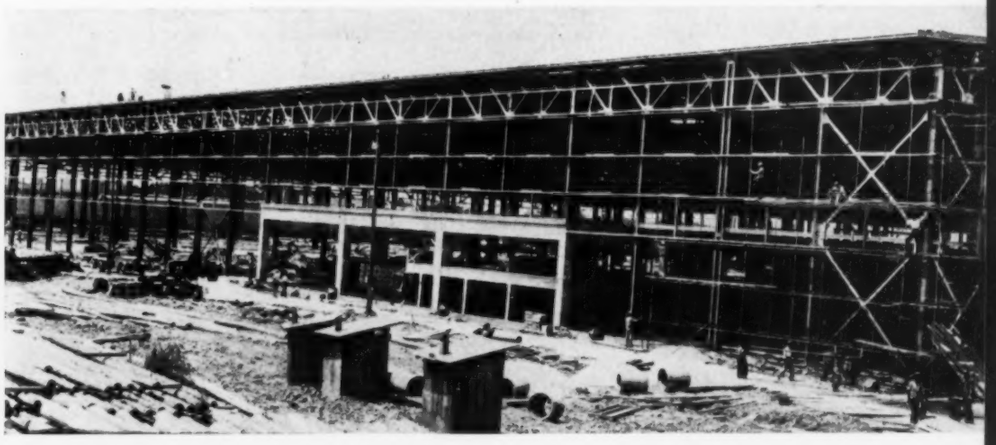
planked or surfaced with shell, heavy construction machines, such as cranes and piledrivers, had to support themselves on timber mats. In digging foundations and large pipe trenches, cypress stumps were constantly encountered, making slow hand excavation necessary.

All the important and permanent structures rest on timber piles averaging 50 ft. long, designed for 15-ton loading and capable of carrying heavier loads. The piles penetrate to a fine sand or firm clay which gives them good carrying capacity. In its original condition, the site was covered with a top layer of decayed vegetable humus 2 to 9 ft. deep. Surface elevation of this top layer was only 1 to 2 ft. above the water level in an adjacent canal, part of the Intra-



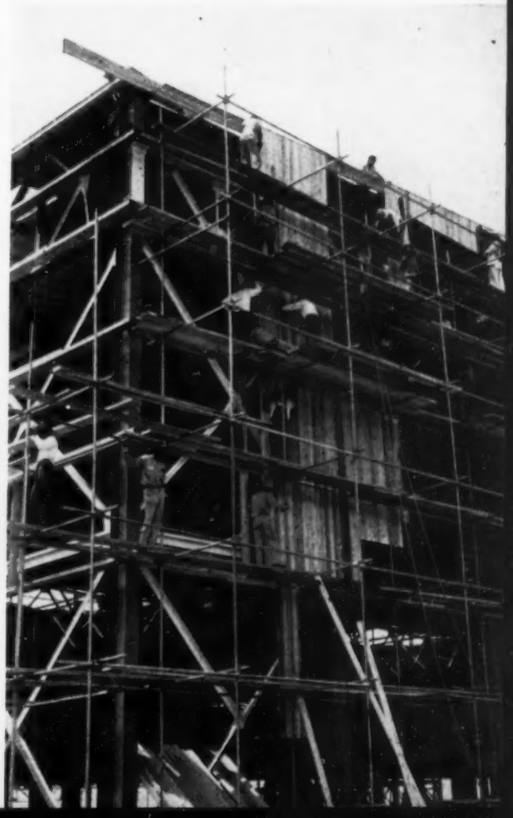
MORE THAN ¼ MI. IN LENGTH, this side of sub-assembly wing of manufacturing building shows typical closure wall construction by men working on tubular steel scaffold. Wood sheathing is covered by building paper and asbestos-cement shingles.

ARCHITECT-ENGINEERS for plant are represented by these two men in charge at site: **ROBERT E. LINTON** (right), vice president and project manager, and **JAMES L. GILROY**, superintendent, Albert Kahn Associated Architects & Engineers, Inc.

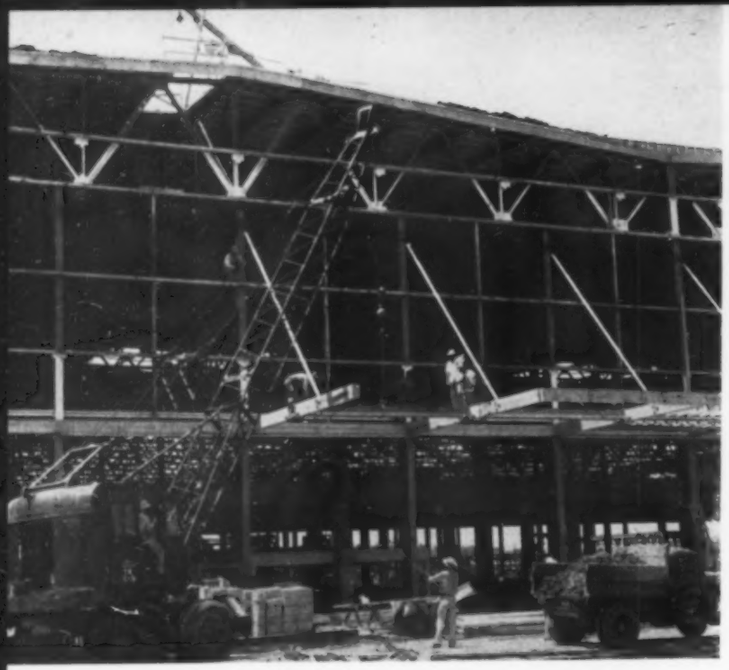


REINFORCED-CONCRETE MEZZANINE STRUCTURE occupying three 40-ft. bays of manufacturing and sub-assembly area extends through entire length of this wing. Intermediate decks, similar to one visible at this end, are installed at some locations under mezzanine for toilet rooms. To right of mezzanine structure, workmen are erecting tubular steel scaffold outside building to permit starting construction of closure wall.

TUBULAR STEEL SCAFFOLD (right) provides working platforms at several levels for carpenters nailing 2-in. plank sheathing to timber girts. Layer of building paper is attached to sheathing before shingles are applied.



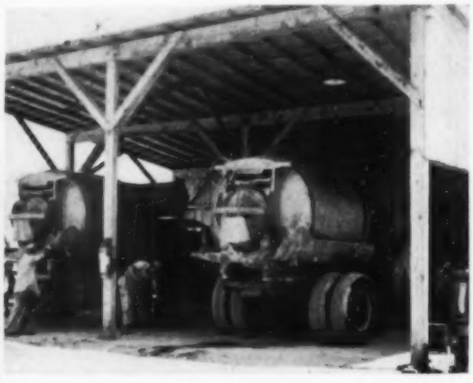
PRECAST CONCRETE ROOF SLABS (below), made with light-weight aggregate, are nailed to purlins on roof deck of 38-acre manufacturing building. Steel purlins of roof frame carry wood nailing strips; intermediate purlins are timber.



TRUCK CRANE handles timber member into canopy frame over unloading platform. On roof deck, note derrick used for hoisting roofing material. Hoisting line is operated by stationary hoist engine on ground.

CHANNEL-SHAPED PRECAST SLABS 2 ft. wide, weighing 13 lb. per sq. ft., are laid on roof purlins spaced 6½ to 7 ft. c. to c. Nails are driven into purlins through cored holes in precast slabs.

PANEL FORM (left) for exterior girder of reinforced-concrete veneer mill is raised to position on columns by Bucyrus-Erie crawler crane. Timber shores support beam and slab forms of roof.



GREASE GUN lubricates truck-mixers in service shed at batching plant.

coastal Waterway, which borders one side of the 1,100-acre area.

Under the humus, test borings disclosed other layers of soft materials (wet clay-silt, wet clay-sand and silty sand), extending to depths of 15 to 25 ft. below the surface. Below these soft layers is a firm clay or a fine sand. Hydraulic fill was obtained by dredges from the canal and from a connecting basin which extends along another side of the site. The dredges excavated to depths of 45 ft. where sand pockets or lenses were encountered in order to put as much sand as possible into the fill, particularly under the runways of an airfield which is to be constructed as part of the plant.

Over the rest of the plant area the fill is spotty in character, but in general it averages about 40 percent sand, 40 percent silt and 20 percent clay. The sand

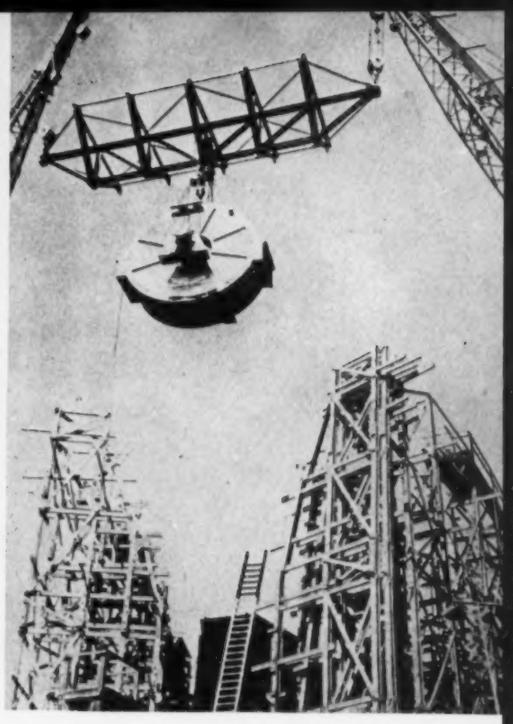
(*Continued on page* 130)

SEEN FROM BELOW (below), straight lines of flanges on precast concrete roof tile make pleasing rectangular pattern with purlins.

AFTER JOINTS (right) between roof slabs have been sealed with non-drip asphalt mastic, layer of 1-in. mica insulation blanket is laid in mopping of hot pitch. In center of picture, insulation has been covered for protection with roofing felt held down by sheets of 1-in. insulating material. To avoid extreme summer heat, most of roofing was placed at night under floodlights.

U. S. ARMY ENGINEERS sling rope across mine-blasted crater on Sicily's coast road so scouts can work their motorcycles over gap. This 150-ft. crater, located on mountainside shelf road 200 ft. above sea, was bridged by Engineers in 20 hr.

Corps of Engineers Photo



FOR SHIP PROPULSION this 10,000-hp. General Electric motor (right) ranks among largest marine motors ever built. It is here being swung by two whirley cranes over hull of new steel tanker at California yards of Marinship Corp.

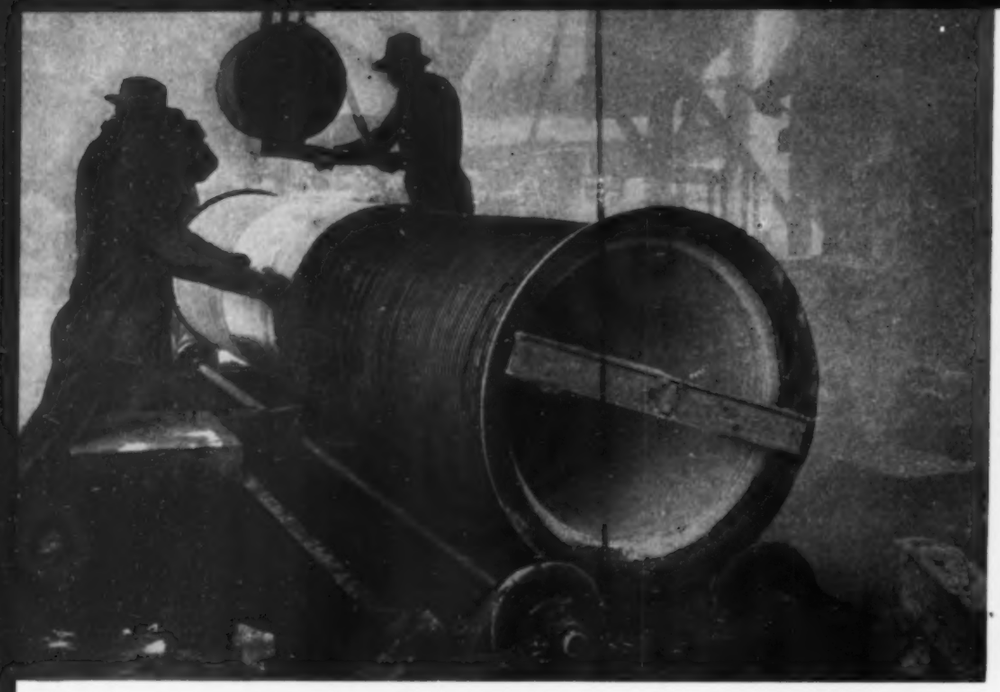
ARC WELDING is taken up by CLAUDETTE COLBERT (right) in her latest picture, "Since You Went Away." Teaching her technique is G. L. REVELL, welding engineer for Lincoln Electric Co., who plays welding instructor in movie. In background is Alla Nazimova in role of fellow welderette.

JOB oddities

GREMLIN ATTACKS PILEDRIVER (below) during construction of bridge somewhere in South Pacific. This illusion of insect war on Marine Corps engineer unit is created by bug which lighted on camera lens just as shot was made.

U. S. Marine Corps Photo

CALIFORNIA ROAD SIGNS IN SOLOMON ISLANDS puzzle U. S. Marine (right) standing beside his jeep at crossroads. Above and below marker indicating direction of Camp Alligator are standard California state highway signs sent at request of Capt. B. W. Decker, U. S. Navy, to make boys "feel more at home" in South Pacific war theater. "As fast as we drive the Japs out," reports Capt. Decker, in letter to T. H. Dennis, maintenance engineer, California Division of Highways, "in comes a road and up goes a sign."



STEEL WIRE is wound spirally on pipe as it is turned by mechanical means on wrapping machine. Wrapping is done with high tensile strength steel wire No. 6 gage, 0.192 in. in diameter. Gross tension of about 3,000 lb., or 86,000 psi., is applied to wire in wrapping operation.

PRESTRESSED CONCRETE PIPE attains satisfactory strength after steam curing and can be handled into place in five days after completion.

PRESTRESSED CONCRETE PIPE Made by New Method Saves Steel

IMPORTANT SAVINGS in steel tonnage required for high-head reinforced concrete pipe have resulted from application of the principle of prestressing steel in tension and concrete in compression. The new manufacturing method was developed by the Lock Joint Pipe Co., of Ampere, N. J., and one of the first major installations was for water system extensions in Washington, D. C. The total order for three jobs amounted to about 75,000 lin. ft. of 30-in. pipe and the steel saving totaled more than 1,000 tons when compared with the tonnage required for steel cylinder reinforced concrete pipe designed for the same head. When compared with the tonnage required for steel pipe of 5/16-in. plate, the saving was nearly 2,000 tons.

The new pipe follows the general Lock Joint design in having a continuous welded steel cylinder of No. 16 gage sheets with steel joint rings forming bell and spigot ends and with a rubber gasket as sealing element. This cylinder is centrifugally lined with concrete to a thickness of 1⅞ in. It is spirally wound with No. 6 gage high tensile strength wire under a tension of 3,000 lb. imparting an initial compression in the cylinder and concrete core. The steel structure of the pipe is protected by a ¾-in. thick coating of cement and sand mortar.

Concrete for the interior of the cylinder, after mixing in a paver, is discharged into a special placing device. This device utilizes a screw drive to discharge concrete from the end of a long pipe that is run into the open cylinder for distribu-

(*Continued on page* 118)

STEEL FOR CYLINDERS (below) comes to job in full pipe length, cut to proper width so three sheets make required circumference. Shipped flat, No. 16-gage sheets are put through rolls on job to bring them to proper radius, then held on specially prepared jigs while being tack-welded together. After welding, prefabricated joint rings for ends are attached.

Prefabricated Bridges

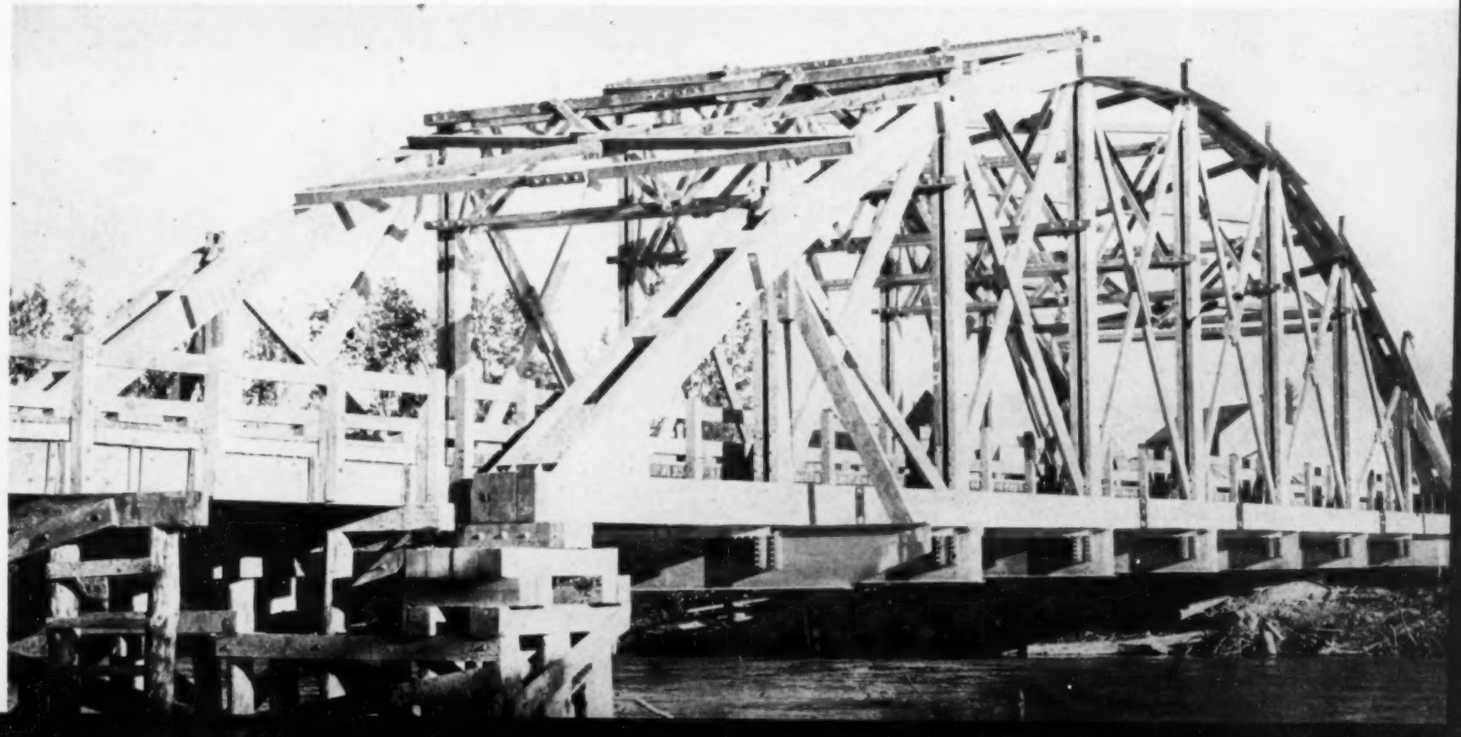
Treated in Oregon and Erected in Alaska

PERMANENT TIMBER BRIDGES, fabricated to blueprints and treated hundreds of miles from their erection site, have replaced many of the temporary crossings on the route of the Alaska Military Highway. A series of prefabricated 160-ft. through-truss spans were ordered by the Public Roads Administration to be stored at a central point and shipped out to whatever sites required them. The connector-joined trusses were fabricated by the Wauna Lumber Co., of Wauna, Ore., and salt-treated by the American Lumber & Treating Co., of Chicago, at its Oregon plant. The complete spans, knocked down with hardware to fit, were then shipped to Alaska. Time and labor are saved in erection of prefabricated spans and use of pressure-treated timber should cut maintenance costs.

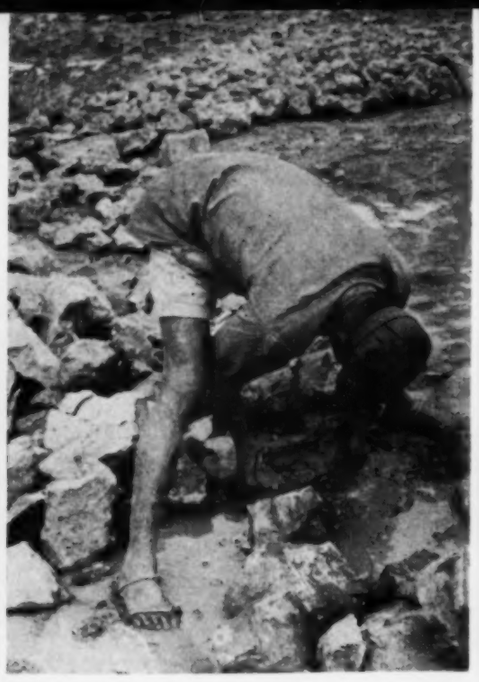
DECKING IS NAILED on timber trestle approaches on south end of Dezadeash River bridge.

TWO 160-FT. THROUGH TRUSSES carry Alaska Highway over Takhini River, which is more than 200 ft. wide at this crossing. Fabricated-to-order structure was shipped from Oregon to northern distribution center at whitehorse and erected by Bates & Rogers Construction Corp., of Chicago.

PREFABRICATED SINGLE SPAN (below) crosses Dezadeash River. Connector-built structure proved well suited to working conditions on Alaska Highway and need for speed in getting bridges up and usable.



Airbases in China



WATER BUFFALO (left) furnishes power for transporting stones to job site. U. S. Air Forces Photo

AFTER CRUSHING to proper size (above) rock is placed to form base for airfield. U. S. Air Forces Photo

BUILT BY NATIVE LABOR AND PRIMITIVE METHODS

USING HAND LABOR and time-honored methods of construction, 300,000 Chinese are building many strategic airbases to serve our Pacific forces when they land in China. Handicapped by lack of modern equipment, they are doing a slow but good job by ancient means. American Army Engineers, working in conjunction with expert engineers of the Chinese Army, supervise the work.

Page 68

ANCIENT TYPE WHEELBARROW, made of split bamboo and wood, with wooden wheel, is used to transport materials. Chinese workers are using 100,000 handmade wheelbarrows on airport jobs. Press Association Photo

LARGE ROCKS (below) are gathered from nearby hills to be used for landing-strip foundations. They are hauled to site on rubber-tired, horse-drawn cars. U. S. Air Forces Photo

ROCKS ARE PASSED from hand to hand by line of workers building runway. Both men and women are included in native labor crews. Acme Photo

CHINESE WITH SLEDGE HAMMER breaks rock to form airfield foundation.
U. S. Air Forces Photo

ROCKS FOR FOUNDATION are hammered solidly into place.
U. S. Air Forces Photo

CHIPPING OF STONES (below) for airfield runway is done by hand by Chinese workmen, who carry on successfully without modern equipment.
Acme Photo

AS SUBSTITUTE FOR CEMENT (below) earth is taken from hills and later mixed with water to form slurry for binding rock foundation. Primitive rush baskets are used to transport material.
U. S. Air Forces Photo

HAND-MADE CONCRETE ROLLER drawn by water buffalo is used in surfacing parking area. This roller is much lighter than coolie-operated one used on landing strips. U. S. Air Forces Photo

MUD FOR REVETMENT (below) is taken from bottom of stream to save labor of mixing with water. Three mounds in water behind soldier are customarily left by Chinese at their excavations to indicate how much earth they have removed. U. S. Air Forces Photo

"RICE-BURNING ROLLER" (below) drawn by 500 coolies compacts stones and gravel used in Telford-type base. U. S. Air Forces Photo

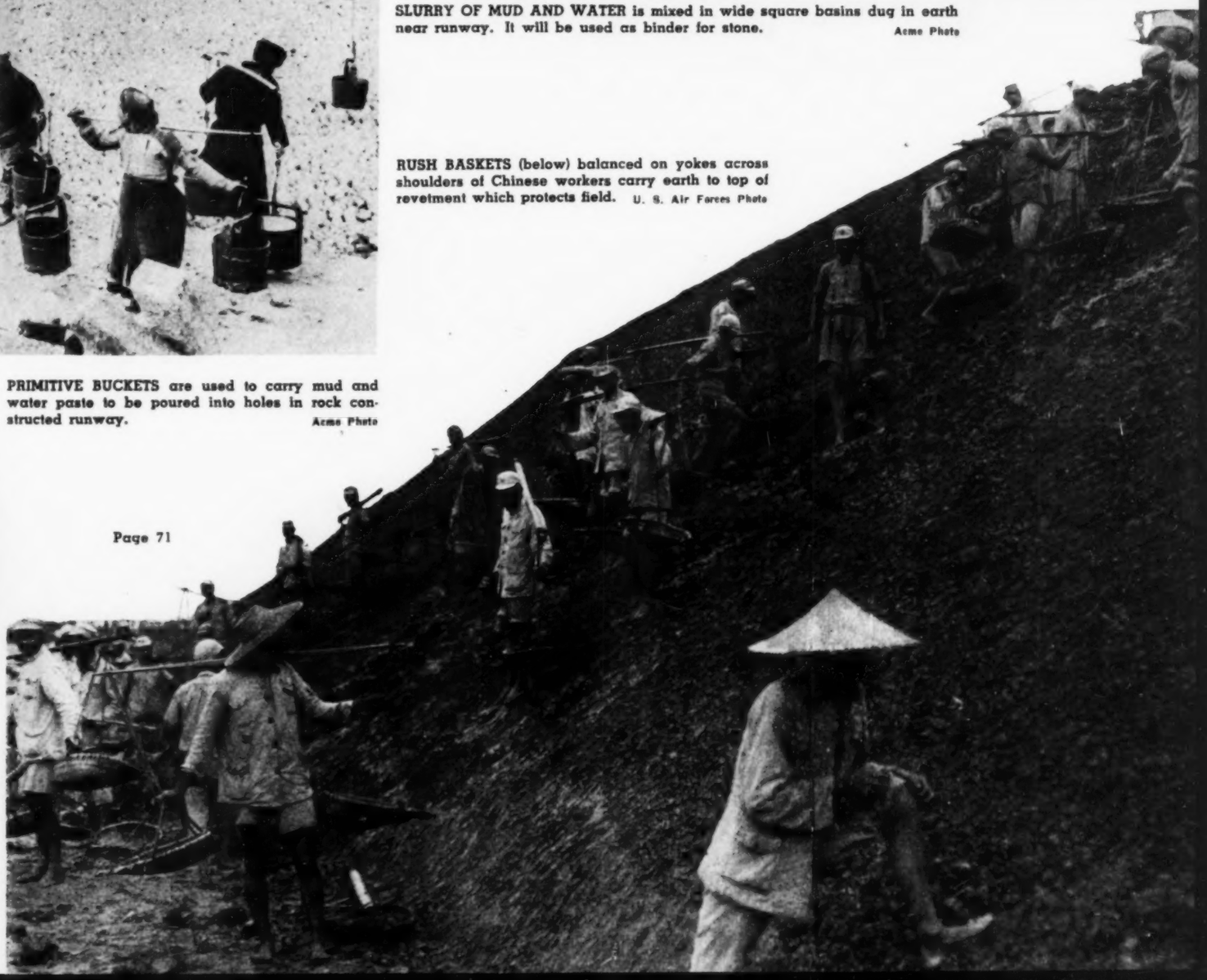
Airbases in China

...Continued

SLURRY OF MUD AND WATER is mixed in wide square basins dug in earth near runway. It will be used as binder for stone. Acme Photo

PRIMITIVE BUCKETS are used to carry mud and water paste to be poured into holes in rock constructed runway. Acme Photo

RUSH BASKETS (below) balanced on yokes across shoulders of Chinese workers carry earth to top of revetment which protects field. U. S. Air Forces Photo

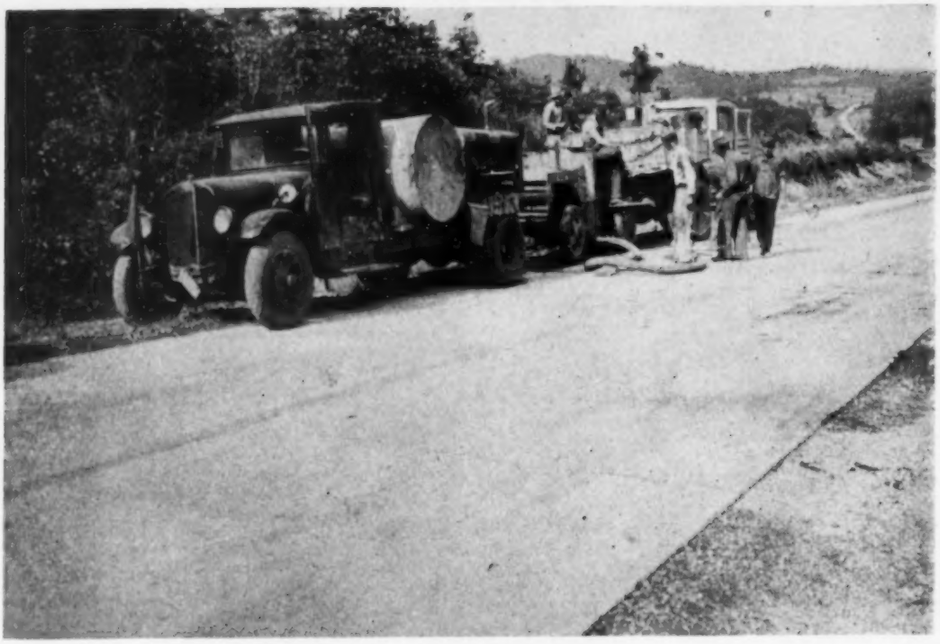


Wartime Maintenance OF STATE HIGHWAY SYSTEM

By D. W. MOULTON

Division Engineer

Tennessee Department of Highways and Public Works



MUD JACK is used where pumping action has damaged concrete pavement. Constant attention is required by these hard-surfaced roads.

From a paper before University of Tennessee Highway Conference

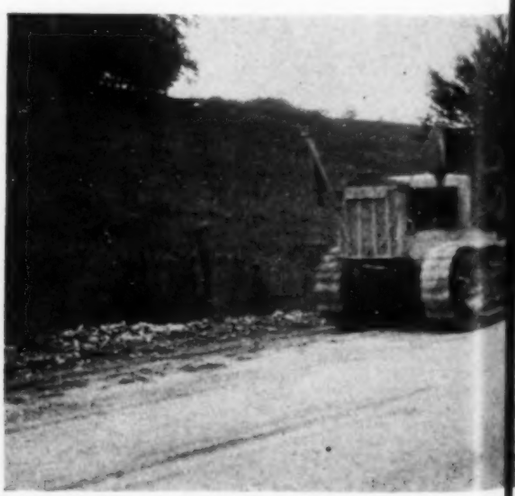
WE ARE NOW WITNESSING the first downward curve in highway revenue resulting from the decrease of highway usage. Money for improvements and new construction of highways, except for those of prime military importance, has of necessity been curtailed, but never in the history of our nation has the existence of our highway system been of such vital importance as it is today. The traffic on a great many of our roads has been reduced, while on others there has been a great increase in axle load, though a decrease in number of vehicles. The revenue from the gasoline tax has been reduced in some states by 20 to 30 percent. It may fall even lower.

In 1942 Tennessee had a network of 60,000 mi. of roads of all types, representing the expenditure of about $750,000,000. The maintenance cost of the state highway system alone, comprising 7,500 mi., has for several years required more than $2,000,000 annually. This sum is, perhaps, less than one-half the total amount expended on the combined county and state systems. We may be forced to reduce our maintenance expenditures, both county and state. In that event, curtailment of expenditures for highway maintenance should be confined to those items that add to appearance of the road and the comfort and safety of the user rather than those that are essential to the preservation of the pavement itself.

The decrease in highway maintenance has already assumed dangerous proportions in some states. It has been estimated by reliable authorities that highway maintenance workers are now 33 percent fewer, on a national average, with the State of Maine reporting a drop of 61 percent. We have progressed far enough under wartime conditions with our highways to observe that the cost of highway maintenance will not decrease in direct proportion to the reduction of the traffic count. We are finding out that the greatly increased axle load and the concentration of heavy army equipment near camp sites, maneuver areas and defense plants are playing havoc with roads that we have heretofore considered to be of adequate design.

I shall enumerate some of the many es-

RETREADING AND SEALING add extra years of service to secondary roads of bituminous types. These repairs should not be delayed.



PERIODIC DITCHING and reworking preserve farm-to-market roads. Thorough overhauling, ac-

sential features of highway maintenance which should be preserved in these times of war and indicate a few features which might be deferred.

When making studies of maintenance methods and costs we have generally grouped our roads under four separate heads:

(1) Unimproved earth road.

(2) Loose gravel or crushed stone surfaced road.

(3) Flexible type bituminous surface of thin mat design, a type which is prevalent on many of our state highway systems.

(4) Rigid pavement consisting of plain cement concrete and concrete bases with bituminous surface courses.

A far greater percentage of the total highway maintenance cost than most of us realize is utilized in an attempt to stabilize and repair the natural and abnormal changes caused to our highways by the action of the elements, or weather conditions. Of one thing we may be sure: the deterioration caused by the rain and the snow, the freeze and the thaw, and the other action of the elements will not wait until the war is over. These destructive forces have been at work throughout the ages; they shall continue.

In considering the items of maintenance that should be preserved we must remember that on *all types* of roads drainage is one of the most important things to watch during this emergency. A well drained and ditched road with adequate structures, properly functioning, will go a long way toward reducing the necessity of replacing and patching surfaces and many other costly repairs.

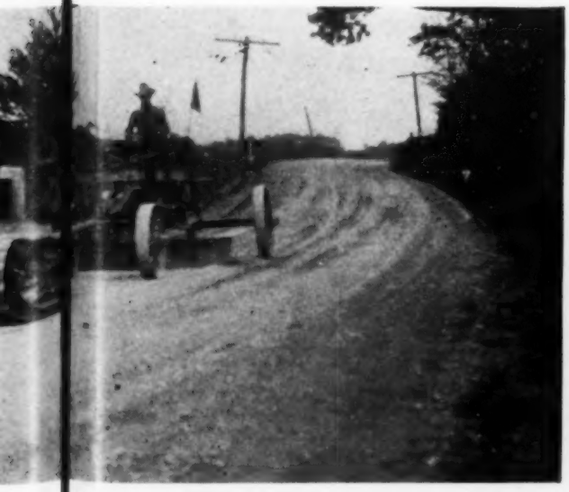
Roads in the first and second classifications—earth, gravel, chert, or stone roads—must be reworked or reshaped periodically. Reshaping, with the necessary dragging or blading and the addition of surface metal when and as required, render these roads useful. If these roads are kept well drained and ditched it may safely be assumed that the regular periods between blading may be lengthened and the periodic addition of stone or gravel may be decreased in proportion to the decrease in traffic. A thorough overhauling, accompanied by a good dose of ditching, must be on the maintenance schedule for these roads at periods of sufficient frequency to insure the retention of the desired roadway shape or cross-section. Otherwise we shall be faced with the expensive problem of reconstruction.

The third classification—the flexible type bituminous pavement—takes in a great percentage of the mileage of our state highway system. Roads in this particular group, because they are in general constructed on thin bases and are of themselves thin in design, require constant attention, not only for the preservation of the necessary drainage features, but especially as to their surface requirements. On these thin bituminous surfaces the good maintenance man must be always on the alert. It is patch, patch and patch, and seal, seal and seal. The old saying that "a stitch in time saves nine" was never more applicable than in the maintenance of a thin mat bituminous road. To delay in the repair of this type surface is indeed serious, as very much delay will often necessitate reconstruction of the entire surface at a duplicate of the initial cost.

The maintenance of this type of surface is probably one of our largest war-

(*Continued on page* 124)

MILES OF BITUMINOUS ROAD need resealing, since continued neglect imperils initial investment and means costly reconstruction.



companied by ditching, is essential on earth roads to forestall necessity for costly reconstruction.

STONE AND GRAVEL ROADS require continuous attention. Ditching, blading and addition of metal should continue during wartime.

MOTOR TRUCK with scaffolding and platforms mounted upon it is used by French-Canadian Engineers in England to build Romney hut. Truck moves along as work progresses and speeds construction.

British Combine Photo

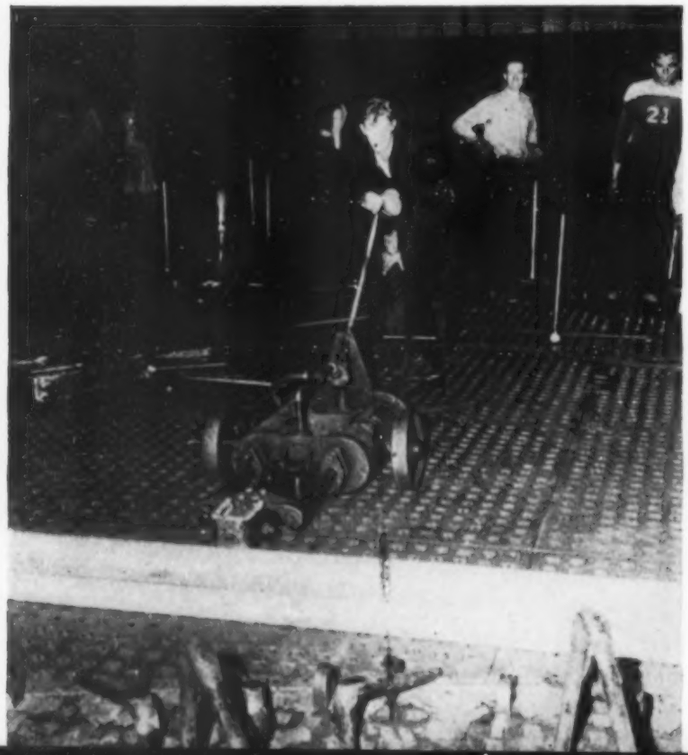
BOARDED UP to throw heat into cab, Tournapull travels on 8-ft.-deep ice by Mackenzie River en route through Northwest Territory to Canol oil pipeline built by Bechtel-Price-Callahan Co. Temperature frequently dropped to 55 deg. below zero.

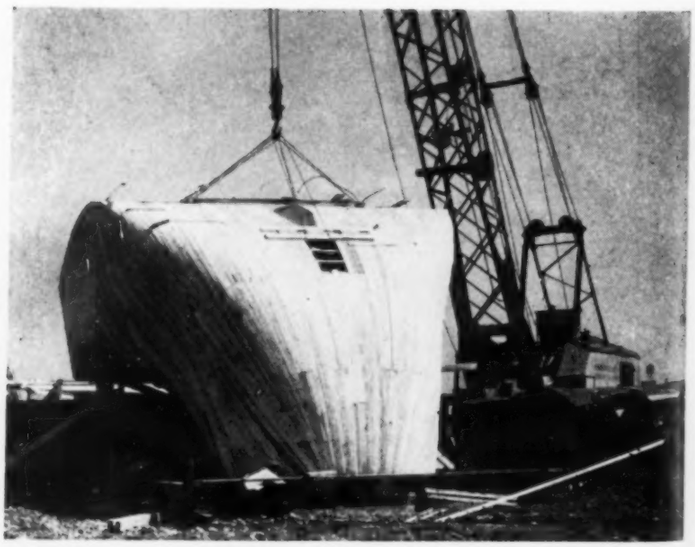
HOW They Did It

CONSTRUCTION DETAILS For Superintendents and Foremen

PORTABLE HYDRAULIC RAM (below) is used to bend red-hot structural members of frame for Liberty ship at Richmond, Calif., yard of Permanente Metals Corp. Heated to more than 1,800 deg. F., steel shape has been hauled from furnace, laid against set bar on slab and fastened down with dogs and pins to be bent into shape. Liberty ship has 531 frames.

Fore 'n' Aft Photo





CONDUIT FORM for one of nine 120-in. open-impeller-type pumps of Mill Creek pumping station, Cincinnati, (described in "Construction Methods," April, 1944), is fabricated in form yard by carpenters of La Crosse Dredging Corp. and Ferd J. Robers Construction Co., contractors for U. S. Engineers. Completed form is picked up with aid of strongback by long-boom crawler crane of 40-ton capacity.

COMPRESSED AIR ROUTER (left) removes 1-in. Firtex joint filling material placed between walls and columns of powerhouse at Keswick Dam, now being built at Redding, Calif., by Atkinson Kier Co., for U. S. Bureau of Reclamation. Built in contractor's shop, router's 36-in. handle is made of ¼-in. pipe, reinforced by ⅛x1-in. piece of strap iron. Air is fed through handle to cutting wheel housing. Cutting wheel consists of 4-in. hub holding eight cutting teeth. Wheel revolves on ball bearing taken from whirley air pump and clearance of 1/6 in. is allowed between cutting teeth and wheel housing. Entire machine is only 13/16 in. thick, allowing it to be used with ease in 1-in. space between powerhouse walls and columns. — From R. K. Fowler, Job engineer, Atkinson Kier Co.

ALL-METAL RAM (right) is used at yards of Ingalls Shipbuilding Corp., Pascagoula, Miss., to change keel blocks during painting of hulls. Devised by A. A. McDonald's Department 10, it replaces huge wooden ram which was held in arms of four men, requiring more time and causing operators to tire quickly.

SMOKING HOT WOOD BLOCK which has protected butt of 50-ft. pile is removed from cast-iron driving cap after creosoted pile has been put down to grade at huge new plant near New Orleans, La., built for Higgins Aircraft, Inc., by Turner Construction Co. and Raymond Concrete Pile Co. (described in this issue). Building substructures required 8,000 piles, driven by three Marion steam cranes.

MAN-SIZE TRICYCLE (below) is used to replace nearly 400 burned out light bulbs each week in 8½ mi. of galleries inside Grand Coulee Dam in Washington. About 2,800 lights, requiring only minute fraction of output of dam's 800,000 kw. powerplant, burn continuously in hallways of this U. S. Bureau of Reclamation project.

SAND SLEDS (below), hauled by International tractor, are employed by U. S. Marines to level off and pack down surface of beach on South Pacific island to facilitate unloading of supply vessels.

U. S. Marine Corps Photo

LEGAL ADVENTURES of TRACTOR CONN

By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the 30-Cent Wire

"Send a telegram to Tractor Conn and tell him that he's authorized to draw on me for the $978 I owe him," the debtor suggested.

"Thirty cents," the Western Union operator told him and the debtor paid.

"Draw a draft according to that wire, attach the telegram, take them down to the Contract Bank and get the cash," Conn ordered.

"How do we know he owes you or that he'll accept when it gets there?" the cashier demurred.

"Look at the telegram attached."

"Oh yes, that makes it all right," the cashier agreed and handed over the cash.

The draft went forward, the debtor did not pay, and the bank came back on Tractor Conn.

"Sue him and I'll stand the costs," Conn suggested.

"We can't. He didn't accept it."

"That telegram I showed you is an acceptance."

"I doubt it."

"Go ahead and I'll take the responsibility."

"Well, it's your lookout," the cashier retorted and the bank sued the debtor. The Oklahoma Supreme Court, in the case of Bank vs Muskogee, 139 Pacific Reporter, 1136, decided in favor of the bank under a statute providing: "Where an acceptance is written on a paper other than the bill itself, it does not bind the acceptor except in favor of a person to whom it is shown and who, on the faith thereof, received the bill for value. This telegram was exhibited to the bank and attached to the draft before it was honored and paid. The evidence also showed that the debtor paid for the transmission of the telegram. This, we think, shows a sufficient acceptance."

The Case of the Unaccepted Order

If Tractor Conn gives an order to a traveling salesman and it is specified on the order blank that it is not to be binding until accepted by the wholesaler, then, of course this clause governs, and Conn has no recourse if the wholesaler rejects the order. All this is elementary enough but, in this particular case, the wholesaler neither accepted nor rejected the order. Conn waited for more than a reasonable time and then demanded delivery.

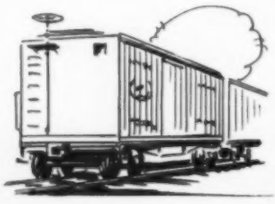
"Your delay for an unreasonable time is the same as an acceptance of my order," Conn contended.

"No, you have no claim until I've accepted the order, and there's never been a direct acceptance," the wholesaler retorted.

The law on this point is not clear, but the Tennessee Supreme Court in a case reported in 214 Southwestern Reporter, 917, ruled in Conn's favor.

"Delay in communicating action as to the acceptance may amount to an acceptance itself. When the subject of a contract, either in its nature or by virtue of conditions of the market, will become unmarketable by delay, delay in notifying the other party of his decision will amount to an acceptance by the offeror. Otherwise, the offeror could place his goods upon the market and solicit orders and yet hold the other party to the contract, while he reserves time to himself to see if the contract will be profitable," is a quotation from the actual words of the Court.

The Case of the Unnamed Railway



Tractor Conn had bought machinery f.o.b. "your nearest shipping point," but neither party named the railway by or the point to which the machinery was to be shipped. The manufacturer had it ready for shipment in due time, but the price went down and Conn gave no shipping instructions specifying either the railway or the point of destination. Then the price went up, and he demanded prompt delivery.

"It wasn't up to me to deliver till I got my shipping instructions," the manufacturer argued.

"You had to ship, regardless of instructions," Conn contended and sued for failure to deliver. The manufacturer set up the defense that he had no shipping instructions and was under no legal liability to deliver until he had. The North Carolina Supreme Court (in Hughes vs Knott reported in 138 N.C. 105) decided in the manufacturer's favor.

"In the absence of any directions in either respect we are unable to see how the shipper would be in default," said the Court.

"In a contract for the sale and delivery of goods 'free on board vessel' the seller is under no obligation to act until the buyer names the ship to which the delivery is to be made; for until he knows that, the seller could not put the goods on board," says the Pennsylvania Supreme Court in a case along the same line.

More Legal Adventures of Tractor Conn Next Month

THE JOB JESTER

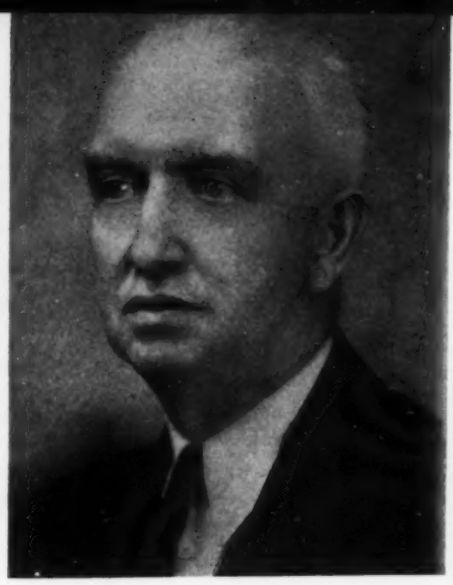
CARTOONS DRAWN FOR CONSTRUCTION METHODS

"Somebody should tell those engineers to slow down. We haven't advanced that far yet." Jeff Keate in Collier's

"What do you mean you'd like to speak with the boss? I am the boss . . . everyone else around here has been drafted!"

"The boss doesn't get much time away from the job these days, does he?"

FOR OUTSTANDING CONTRIBUTION to highway progress, HORATIO S. MATTIMORE (right) receives George S. Bartlett Award, which is given annually by American Road Builders' Association, American Association of State Highway Officials, and Highway Research Board of National Research Council. Now with the Bureau of Yards and Docks, U. S. Navy, at Wilmington, N. C., Mr. Mattimore was for 25 years engineer of tests and research for Pennsylvania State Highway Department. Presentation was made at recent convention in Chicago of A.R.B.A.



CHIEF ENGINEER at General Headquarters in Australia for Southwest Pacific Area is MAJOR GENERAL HUGH J. CASEY (right), whose double stars are being pinned on following recent promotion, by COL. LEIF J. SVERDRUP, chief of engineering construction section. General Casey was in charge, under Lt.-Gen. Somervell, of national defense construction program aggregating $2,000,000,000.

Signal Corps Photo

Present and Accounted For

NEW PRESIDENT of Association of Highway Officials of North Atlantic States is WILLIAM J. COX, who is now serving his second 4-year term as state highway commissioner of Connecticut.

BOSTON DISTRICT ENGINEER for Corps of Engineers is LT.-COL. HENRY P. DUNBAR, former executive officer and chief of operations in Boston District, with charge of all military construction, dredging, flood control, dams and airports. Before entering Army in 1942, he was connected with the Cape Cod Canal project.

NEWLY ELECTED CHAIRMAN of executive committee of The Asphalt Institute is FRANK V. WIDGER, manager, Asphalt Sales Department, The Texas Co., New York. He will act as coordinating head of engineering and research activities for this national association.

AFTER 23 YEARS as executive secretary of Central Branch (Iowa), Associated General Contractors, ORVILLE W. CROWLEY (right) has resigned to take charge of maintenance on extensive section of Alaska Military Highway for C. F. Lytle Co. and Green Construction Co. For last two years Mr. Crowley has been on leave of absence to serve as project manager for these companies in building Alaska sections of this route.

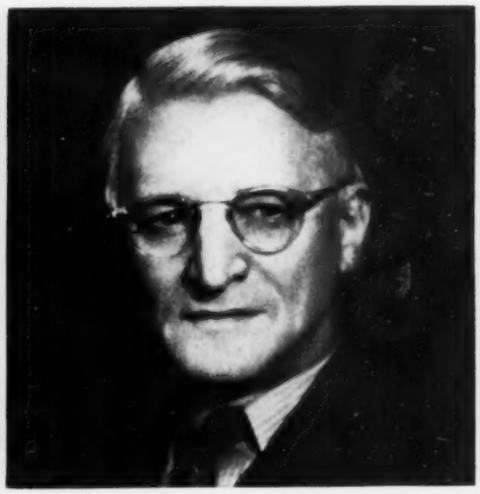
NEWLY ELECTED PRESIDENT of New York State Highway Chapter of Associated General Contractors is ROBERT P. BAYARD (left), vice president of Johnson, Drake & Piper, Inc., of New York. He recently directed large program of construction for U. S. Army in North Africa, Palestine and Arabia. Mr. Bayard is now in South America in connection with proposed large-scale construction.

APPOINTED COMMISSIONER OF HIGHWAYS in Kentucky is J. STEPHEN WATKINS (left), who has been engaged extensively as consulting engineer since 1933. He was executive project manager in charge of design and construction of Camp Campbell, near Hopkinsville, large cantonment project constructed by War Department.

CONSTRUCTION OF BLUE RIDGE TUNNEL, 4,000-ft.-long rock bore for Chesapeake & Ohio Railroad in Virginia, is supervised by these members of Bates & Rogers Construction Corp., of Chicago: (Left to right) JOHN GULLANS, tunnel superintendent; JAMES SCOTT, project manager; R. A. CHERMSIDE, general superintendent; and G. W. ROBINSON, office manager.

Ingersoll-Rand Photo

PAGE OF PERSONALITIES



NEW DIVISION HEADS of Associated General Contractors of America are (left to right): Heavy Construction, G. W. MAXON, president, Maxon Construction Co., Dayton, Ohio; Highway Construction, D. W. WINKELMAN, president, D. W. Winkelman Co., Syracuse, N. Y.; Building Construction, FORD J. TWAITS, president, Ford J. Twaits Co., Los Angeles, Calif.

NEW EXECUTIVE SECRETARY (right) of American Association of State Highway Officials is HAL H. HALE, who was Washington representative of American Society of Civil Engineers. Former city engineer of Knoxville, Tenn., he has also been associated with Tennessee Valley Authority and Portland Cement Association.

RECENTLY ELECTED TO PRESIDENCY (left) of National Ready Mixed Concrete Association is STEPHEN STEPANIAN, of Columbus, Ohio. A pioneer in development of concrete truck-mixer, he is director of National Sand & Gravel Association, vice president of Arrow Sand & Gravel Co., and director of Marble Cliff Quarries Co.

THEY TOOK IT.

No let-up! The same 2-cycle Diesel tractors that hurried the giant defense projects here are under still more pressure constructing new, outlying bases and airfields. Hauling supplies from landing boats (right) is another one of the numerous jobs.

Their names may never be mentioned in history ... but their deeds are carved out for all time.

Joe, Hank, Jack or Blackie—men you didn't want to lose, but whose work now makes you more proud of them than ever! You'd never guess when you "broke 'em in" on the bulldozer and tractor-scraper outfits that they would use that training to help win this war.

Now they are "over there" somewhere . . . either with the combat forces or close behind. One of their biggest jobs is to convert bombed territories and dense, disease-ridden jungles into mammoth air and supply bases. One Seabee said, "Boy, I wouldn't take $5.00 a yard to move this dirt back in the states." But he and others are moving it . . . with remarkable speed and efficiency. They know the fate of our nation is riding on those 'dozer blades as much as on any other tool of war.

• • •

Many of the 2-cycle Diesel tractors our armed forces enlisted to carve out new bases, roads and airfields are the same units used to rush through the big ordnance jobs here. After long hours of tough service they were reconditioned and shipped to foreign shores to continue this fight for our free way of life.

When the time comes to put the big, proposed postwar construction program into action . . . you will find 2-cycle Diesel tractors "in there pitching", taking everything and asking for more. Figure on them, too, for your postwar work!

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

and Asked for More!

2-CYCLE DIESEL OWNERS! Get your copy of our Service Manual on the HD series of Tractors

Gives complete, detailed information on adjustments, service, maintenance and overhaul of 2-cycle Diesel tractors . . . profusely illustrated! Tells you what, when, how! Invaluable to every HD user to maintain the efficiency and lengthen the life of these tractors. Complete in every detail—344 pages, 576 illustrations! Price $1.50 Postpaid.

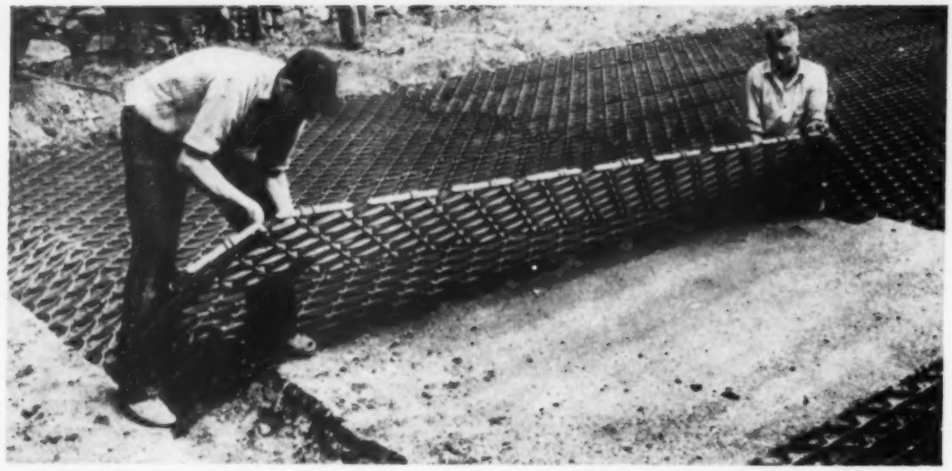
THIS MANUAL WILL SAVE YOU TIME AND MONEY, EXTEND TRACTOR LIFE, CONSERVE CRITICAL MATERIALS

2-CYCLE DIESEL TRACTORS

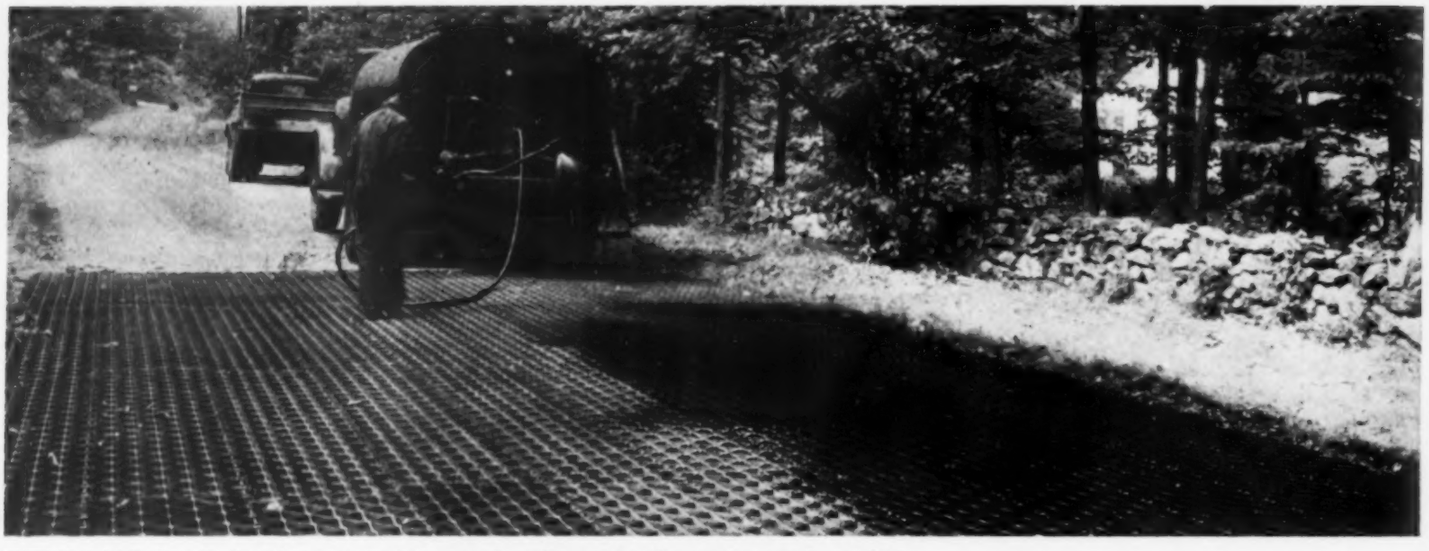
★ BUY WAR BONDS ★ SAVE WASTE PAPER ★ PLANT FOR VICTORY ★ TURN IN SCRAP METAL ★ BE A BLOOD DONOR ★ PAY ONLY CEILING PRICES

Steel Grating

IS TESTED AS HIGHWAY SURFACE



STEEL GRATING MATS, anchored at ends for stability, are laid on experimental stretch of highway. Anchorage is effected by bent ends.



INITIAL COAT of road oil surfacing is applied to steel roadway strip after grating panels are laid.

POST-WAR POSSIBILITIES of prefabricated steel highway are being tested in Darien, Conn., where a 48-ft. long section of "armored" roadway has been installed. The experimental stretch, which is 22 ft. wide, employs the same principle as portable landing mats used by the Army, with the grating laid in 2x12½-ft. panels, filled with sand and surfaced with road oil. The installation is expected to provide the answer to the practicability of entire roads of steel grid.

The project is a joint venture by the town of Darien, Walter Bates, town highway engineer, and the Irving Subway Grating Co., of Long Island City. It is designed as a practical test of steel armoring under normal passenger and truck traffic conditions. If it proves successful, sponsors of the project believe that it may set the pattern for steel secondary roads throughout the country, particularly in those localities where weather conditions result in frequent washouts.

INTERSTICES OF MATS (left) are filled with sand, after which final coating of road oil will be applied over entire surface.

New York Prepares for Post-War Construction Involving $700,000,000

HOW THE CITY OF NEW YORK is preparing now for post-war construction by completing surveys and maps, test borings to determine subsurface conditions, preliminary layouts, detailed designs, plans and specifications ready for the letting of contracts involving a program of more than $700,000,000 of needed public works, was disclosed by Dean G. Edwards, Chief Engineer, Borough of Manhattan, in a recent address before a joint meeting of the Pittsburgh Section, American Society of Civil Engineers, and the Engineers Society of Western Pennsylvania. Mr. Edwards said in part:

"In New York City the need of a post-war construction program was recognized very early. All construction work, except limited maintenance, was stopped two years ago. We had many engineers, civil service men of non-military age and not needed in the war effort, and splendidly qualified, who were available. We had our six-year program of public works on which each department reported annually through the Planning Commission.

"Early in 1942, the Planning Commission submitted to the Mayor a report with recommendations for projects to be included in a post-war program. To provide funds for design and specifications, funds were allocated in the capital budget for work to be done after the war. The allocation of these funds does not include appropriations for construction. Each department must request construction funds from the Board of Estimate when the time has come for construction. The funds now appropriated include the cost of studies, surveys, working drawings, specifications and contract documents.

How Projects are Originated

"The word 'planning' has become so overworked and applied to so many social schemes of all kinds, that it now seems to mean almost anything, from remaking the universe down to designing a simple engineering structure. 'Mapping' as a substitute is too limited in its general application. In our office, we do not use 'planning' at all. First, we study a project and make a layout or preliminary plan. When the preliminary plan is approved, the project goes into 'design'. Incidentally, surveys are made; these surveys are engineering surveys for locating topographical features. Boring contracts are let for determining sub-surface conditions. A specification writer prepares the specifications. As our contract forms have been standardized, these do not entail much work, but both specifications and contract documents are reviewed by the Corporation Counsel. These routine matters are the preliminaries to contract letting and are the items which we are now completing and placing on the shelf as rapidly as our personnel permits.

"The estimated cost of the construction program for which designs are being made, is more than $700,000,000. This does not include any of the public housing programs or projects which will be done by the Tunnel Authority, the Port of New York Authority or the Tri-Borough Bridge Authority. The money for construction is raised by sale of bonds, mostly serial bonds, which run to various dates of final maturity. The maturity period depends on the anticipated life of the project. Many run to 35 years. Corporate stock, another form of bonds, issued for subway construction, usually had a 50-year maturity, which is the largest legal period for which any bond may be issued.

"Some of the improvements are so-called assessable improvements. This type of improvement includes highways and sewers and is paid for out of the proceeds of the sale of assessment bonds. Assessment bonds are paid off by assessment against the local area of benefit, or the Borough in which the construction is done, or the City at large. In the end, the money all comes out of the taxpayer and from receipts from city activities such as dock rentals, etc."

The various types of projects which are being designed include the following:

The Board of Education is making plans for additions and alterations to 11 schools and the construction of 56 new elementary, high schools and vocational schools, at a total cost of $109,000,000.

The Department of Hospitals has projects for reconstruction and additions to 39 existing hospitals and the construction of 3 new ones, at an estimated cost of more than $100,000,000.

The Department of Marine and Aviation is preparing plans for 18 new piers, airports and reconstruction projects, totaling more than $16,000,000.

The Department of Parks has 36 projects which include new parks, playgrounds, parkways, etc., which will cost more than $43,000,000.

The Department of Public Works has 32 separate projects including court houses, bridges, sewage treatment works, etc., at a cost of $109,000,000.

The Board of Transportation has 10 separate projects for new facilities to its rapid transit lines, at a cost of $79,000,000.

These represent the planning of a few of the larger city departments. In the program for the Borough of Manhattan there are 45 separate projects with an estimated construction cost of $65,000,000. Of this total, about one-third or nearly $25,000,000 worth of construction is now designed.

1944 Outlook for Industrial Engineering and Building

EMPHASIS DURING 1944 in the field of industrial engineering and building will be placed definitely on design work for post-war plant conversions, expansions and additions, according to a consensus of leading members of The H. K. Ferguson Company, industrial engineers and builders of Cleveland and New York. Participating in the survey of '44 prospects in the industry were: C. A. Harwick and J. Stuart Sneddon, vice-presidents, and more than 20 of the top members of the organization. Pertinent points summarized from the survey of the group follow:

Reconversions of plant facilities already are under way in some instances. Many government plants have shut down. Some are—and have been—actually converted to other purposes. Others are being wrecked or dismantled. The result is that we are entering a period of industrial conversion.

Some construction materials are now available for use in sufficient quantities—among them steel and lumber—but controls are still being maintained by government agencies. By late summer we can hope for War Production Board releases on certain items. Top military and production men will then know better our material requirements for the future because the European invasion pattern will be set.

A shortage of designing and construction engineers is likely to develop. It is, therefore, important for corporations to plan early, to make detailed drawings, specifications; to write and actually place purchase orders for future delivery. Men are now available; competent organizations are intact.

Prepare Plans Now

The peak in building costs has not yet been reached. Post-war costs will be higher per unit than war costs. A runaway market may be expected once the post-war building program starts. That's a factor to consider in drawing up plans now, having them ready just as soon as materials are available for "civilian" consumption. By having them finished early, top market prices can be avoided.

It is true that the country is "overbuilt" in total volume of factory floor space. But the floor space is generally not located in the proper places for economical use. The reasons are legitimate, the principal one being that sites for wartime plants and sites for peacetime plants don't have the same requisites.

TOP NOTCH RESULTS *from the start*

SUPER-VULCAN OPEN TYPE
DIFFERENTIAL-ACTING
PILE HAMMERS
18C, 30C, 50C and 80C

More and more users are depending on VULCAN to get their pile driving requirements done faster and get a more rapid start on construction.

More and more repeat orders tell the story of satisfaction. Users find that they can drive piles faster, easier, and at less cost—get more dependable performance and longer service from their Super-VULCAN Open-Type Pile Hammers.

Rugged strength—simple design—positive action — durability — compactness are all important features. You use ¼ to ⅓ less steam —you get the hard hitting blows that count and twice the blows per minute. Super-VULCAN Hammers are being currently used in the Solomons and other theaters of war.

The open type fits the same leads and uses the same accessories as the VULCAN Single - Acting Pile Hammer.

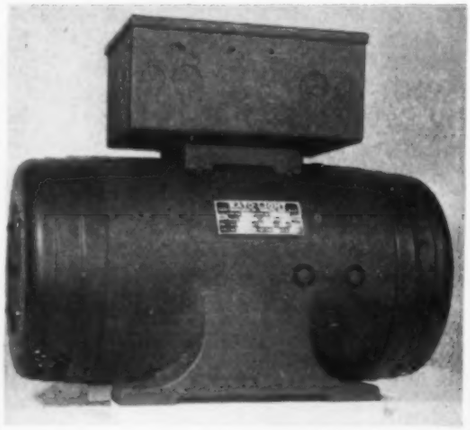
Sizes
18C—30C—50C—80C
meet all needs

VULCAN IRON WORKS Since 1852
331 North Bell Avenue
Chicago **Illinois**

CONSTRUCTION EQUIPMENT NEWS

JUNE, 1944 REVIEW of Construction Machinery and Materials

HIGH FREQUENCY MOTOR GENERATOR has both units mounted on one frame and the cores of the motor and generator are two distinct armatures mounted on one common shaft. Varied voltages and frequencies are available, such as either 400 or 800 cycles. Also motor winding may be tapped to deliver 60 or 120 cycles at either 1,800 or 3,600 rpm. Voltages range from 60 v. on the tapped winding to 250 v. on the 800-cycle winding. Capacities up to 1,000 watts. Motor can be wound for dc. voltages 110 or 220 v. dc. input. Voltage



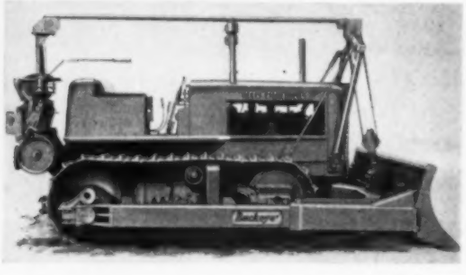
regulation is approximately 6 percent at 120 cycles and 24 percent at 720 cycles. Frequency regulation is 1.6 percent at 1,000 v.-amp. Lamination stock used in this unit is best grade sheet chosen for its electrical characteristics for controlling and holding to a minimum core and hysteresis loss. Brushes are selected with ample brush cross-section to insure long life and quiet operation. Commutators are built of high grade copper with India mica separators. Whole assembly is encased in oil, acid and water resisting plastic. Unit is light weight and compact, approximately 16⅜ in. long, 8¾ in. wide, 13¼ in. high and weighs 110 lb.—**Kato Engineering Co., Mankato, Minn.**

★ ★ ★

NEW IRON CEMENT, named "Fix-Iron," is said to be unusually effective for repairing broken, cracked or defective metal castings and piping, making joints, seams and loose parts secure, and stopping leaks in boilers, furnaces, firepots and other metal equipment. Comes in powder form and is mixed with water, as required. No heat necessary. Quickly and easily applied with putty knife or similar tool and may be hammered into cracked or broken parts. Rapidly hardens like iron. After metallizing, "Fix-Iron" possesses the same expansion and contraction properties as iron itself, thus assuring a permanently tight joint regardless of temperature changes. Can be used on iron, steel, brass and other metals and also on wood. Available, without priorities in 1- and 5-lb. cans and 100-lb. kegs through mill supplies and hardware jobbers and for household use in 1¾- and 7-oz. glass jars.—**So-Lo Works, Loveland, Ohio.**

★ ★ ★

CABLE-CONTROLLED BULLDOZER AND TRAIL-BUILDER for use with Allis-Chalmers tractors and known as "Centro-Lif," is now available in two models, one weighing 5,855 lb. and other 5,140 lb., without power control units. Both models are controlled by Buckeye single- and double-drum power control units. Engine mounted with cable carried overhead from winch to moldboard. New feature is center lift construction of moldboard which



assures light weight for size, simple construction and straight lift of blade. Horn is designed so that moldboard is close to tractor radiator. Push arms are so constructed that moldboard pivots about a single king pin and can be angled to right or left by removing two landside pins, swinging moldboard to desired side and replacing pins. Moldboard may also be tilted by a double trunnion mounting of push arms. By attaching one push arm to top trunnion on one side while other arm is mounted on lower trunnion on opposite side, a vertical adjustment of 12 in. at end of moldboards is provided. Maximum height of lift of loading corner of blade is 53 in., while digging depth of blade below grade is ample for any purpose. Trailbuilder moldboard is 12 ft. 9⅝ in. long and 37 $\frac{5}{16}$ in. high and is fitted with reversible cutting edge and replaceable corner bits.—**Buckeye Traction Ditcher Co., Findlay, Ohio.**

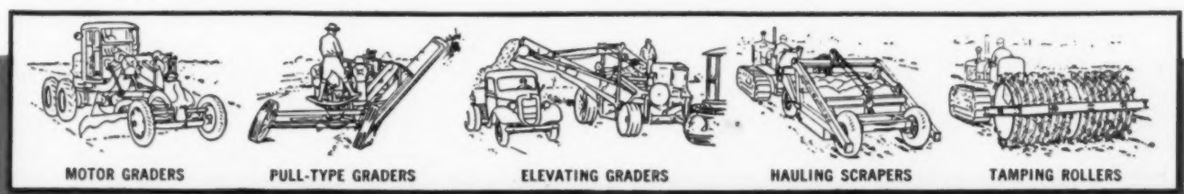
One of a series of ads on Adams motor grader features

AVAILABLE working and travel speeds have a lot to do with what you can accomplish with a motor grader in a day whether it be on construction work, maintenance or snow plowing . . . First, you want a motor grader that will travel to the job quickly. Adams Motor Graders have high travel speeds which cut down travel time . . . When you get on the job you want to make each cut at the fastest practical speed. Adams wide and flexible range of working speeds permits you to get the fastest practical speed for each cut to be made.

On surface maintenance Adams rigidity and balanced weight distribution permit maintaining at speeds higher than satisfactory with most machines. The grader pictured above is maintaining crushed stone roads at 5 to 6 m.p.h. . . . On all work, from bank to bank, Adams ease and economy of operation and quick adaptability to all kinds of cuts make Adams Motor Graders your best buy—always. Talk them over with your local Adams dealer—and use his services in keeping your present equipment rolling.

J. D. ADAMS COMPANY · INDIANAPOLIS, IND.

At war's end we'll need many new roads and many jobs for returning service men. Plan post war projects now and meet both needs.



ADAMS ☆ ROAD-BUILDING AND ☆ EARTH-MOVING EQUIPMENT

+ MIR-O-COL *equals* = MAXIMUM LIFE'S WEAR

Because Mir-O-Col has a deposited hardness of 54 to 57 Rockwell C Scale, high red hardness that resists frictional heat and is shatterproof so that it can be applied the depth desired to give the life's wear required.

This results in reduced maintenance costs and elimination of expensive service interruptions, thus giving a three-way saving: less time-loss, less maintenance cost, less parts cost.

Now, when replacement parts are especially difficult or impossible to obtain, and elimination of time-loss is of paramount importance, is an ideal time to investigate the possibilites of Mir-O-Col hard facing in the solution of your maintenance problems.

Send for your free copy of the "Weldor's Guide to Successful Hard Surfacing Technique."

Inquiries invited from interested distributor organizations. Attractive territories available.

MIR-O-COL ALLOY CO.

"There's Nothing Accidental About Quality"

HARD SURFACING RODS
FERRO-ALLOY CASTINGS
2416 EAST 53rd STREET
LOS ANGELES 11, CALIF.

SELF-CONTAINED, GASOLINE HAMMER PAVING BREAKER does not require an air compressor, air hose and fittings, ignition battery or coil and heavy cable or any other source of power or accessory. Throttle control of blow permits placing tool on spot desired without jumping around. Has been built for easy operation by one man and uses moil points, narrow chisels, gads, wide chisels, frost wedges, clay spades, backfill tamping tools, asphalt

cutters, sheathing drivers or ground rod driving tools, all with 1⅛x6-in. shanks. With solid star drill and using water to flush cuttings out of hole, hammer will drill rock to depth of 30 in. In principle unit consists of a 2-cycle gasoline engine in an inverted position and having two pistons, one an engine piston and the other a hammer piston. Engine piston is connected to crankshaft at top of hammer and drives flywheel ignition magneto and fan for forced air cooling. Free hammer piston acts as movable cylinder head for engine piston and as explosion occurs, is driven downward to strike directly on shank of tool being used and then returned to the "up" or firing position, not by springs, but by low pressure exhaust gases. Starting is by rope pull, same as for any outboard engine. Fuel (gasoline mixed with oil) consumption is relatively low, hammer being equipped with fuel tank having capacity sufficient for several hours operation.—**The Syntron Co., 500 Lexington Ave., Homer City, Pa.**

★ ★ ★

METALLIC FLUX is said to solve problems involved in use of many soft soldering compounds, simplifying soldering and tinning operations, speeding up production and saving time. Claimed advantages: (1) lower melting temperature than soft silver solder on initial heats; (2) once activated, will work on temperatures slightly higher than 60/40 solder, reducing warpage, stresses and changes in hardness of material; (3) high tensile strength and surface adherence; (4) low surface tension permits tinning of close tolerances such as thread fits; (5) no bubbling out. Aluminum, copper, cast iron, steel and other metals may be treated, and a dense deposit made. Readily used as brazing agent. Available in 1-lb. cans only.—**Metallizing Company of America, 1330 West Congress St., Chicago, Ill.**

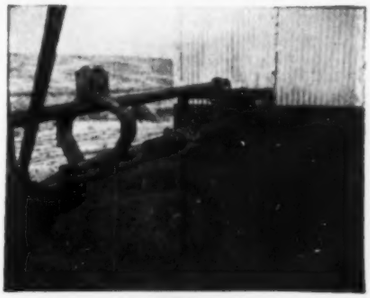
SIX YEARS OF THIS AND IT'S STILL ON!

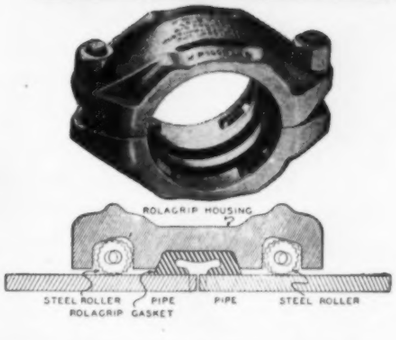
TERRIFIC VIBRATION UNDER 12,000 LB. END PULL PUMPING LOAD 24 HOURS A DAY FAILS TO BREAK BULLDOG GRIP

This unusual application of a Rolagrip Pipe Coupling on an oil well near Russell, Kansas, in 1937, demonstrates the tenacious holding power of the rollers and the enduring strength of the castings. This constant and severe vibration just can't shake the Rolagrip loose . . . it holds steadfast, against the never-ending movement. While this is not a normal use of a Rolagrip . . . it was put on the broken reach rod as a temporary repair . . . it is still holding the 12,000 lbs. of end pull applied thousands of times every 24 hours.

The oil industry has used Rolagrips for many years for line work as well as in place of flanges. No threads or special ends are necessary. Rolagrips are practical because they automatically allow controlled movement to compensate for expansion, contraction and deflection. They can be completely salvaged.

Despite heavy demand, prompt shipments are maintained on Rolagrip Couplings, Segweld Fittings and Gruvagrip Couplings for grooved-end pipe.





G·B MFG. CO.

ROLAGRIP

PIPE COUPLINGS FOR PLAIN END PIPE

ARMY E NAVY

GUSTIN-BACON MANUFACTURING COMPANY

KANSAS CITY 7, MISSOURI

New York Philadelphia Chicago Tulsa Houston San Francisco

MODEL
LD-2

The HEIL Cable Power Control Unit

is designed for long-life, low-cost service

- ★ *Gears of forged alloy steel*
- ★ *Gear Case of welded steel*
- ★ *Clutches fitted with moulded linings*
- ★ *Fully automatic brake action*
- ★ *Control Levers easily adjustable to operator's reach.*

Available separately for cable-scraper operation with all makes of tractors

Many features have been provided in Heil Cable Power Control Units to assure increased output and reduced operating expense. The smooth-operating brake and clutch assemblies eliminate shocks and jerks; the large drums run cool; the sheaves are designed to reduce wear on the cables. This adds up to minimum outlay for cable replacement. Fingertip control gives you lightning-fast action with little effort. For sustained high production and lower operating costs, equip your tractors with famous Heil Power Control Units.

H-29

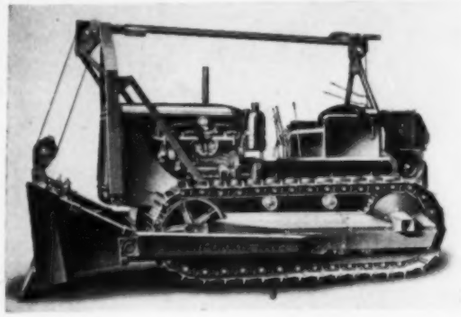
Send for descriptive bulletins.

ARMY E NAVY

THE HEIL CO.

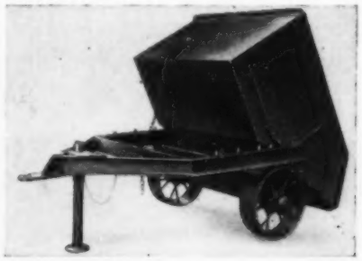
GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

CABLE-OPERATED BULLDOZER designed so its blade may be tilted in four positions—16 in. up or down at either end of blade and 3½ in. forward or backward at top and bottom. In addition, it can be held in straight bulldozing position. Blade can also be raised 45 in. above ground line and dropped 6 ft. below ground level. In raising, powerful lift is developed. This model is cable operated. Gages simplify and remove all guesswork in adjusting blade and make it possible for one person completely to adjust one side of machine before going to other side to make final adjustment. Gages not only indicate that proper adjustments have been made, but also result in increased production because of proper roll given blade. Various blade positions enable "Adjustadozer" to perform wide variety of earthmoving jobs. Tilt of blade permits it to be used for opening shallow "V" ditches and doing hillside work, and is also advantageous in leveling. Forward and backward tilt enables it to work effectively in different kinds of material, from loose dirt to rock. Tilting top forward enables machine to do better job of leveling as cutting edge will not dig in but is pushed over loose earth. When top is tilted backward, cutting edge will penetrate hard material and presents sharp edge to any obstruction. Extremely high lift and drop of blade makes it adaptable to widely varying conditions—from clearing trees (where high lift is required) to controlling loads down steep embankments or over uneven ground. Main frame built of heavy electrically welded box channels, reinforced with large box-type steel plates. Blade consists of welded boxed plates of high tensile steel with moldboard designed for natural plow-like suction with proper curvature for digging and rolling material. Cutting edge of blade is made up of three pieces with center section reversible and end sections hardfaced and replaceable.—**La Plant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa.**



★ ★ ★

DUMP TRAILER with what its manufacturers call an "effortless swing" is now available in 1½-cu. yd. capacity to users of this type of unit. Swings right or left in perfect balance, and, after dumping, the body rights itself and locks in normal position. Body cradle angle permits load to slide out quickly and cleanly. Equipped with Timken roller bearings and may be coupled and pulled in trains.—**Phillips Mine and Mill Supply Co., 2214 Jane St., Pittsburgh (3), Pa.**



VOLTAGE TESTER tests without lamps, giving positive voltage identification and distinguishing between ac. and dc. Markings for ac. voltage are 110, 220, 440 and 550. Markings for dc. are 125, 250 and 600. Frequencies can be determined by vibrations of indicator. Device is housed in cylindrical fiber

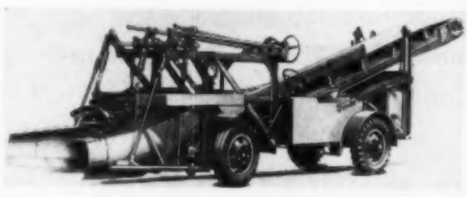
case, for easy gripping, and is practically unbreakable. The 4-in. fiber grips on leads give complete insulation. Leads are 24-in. flexible wire, with double thickness, rubber insulation vulcanized to wire to prevent slipping. Peg and spring assembly prevent sharp bending and breaking of leads where they enter case. Sharp spear points on ends of leads permit piercing of wire insulation for testing without damaging it.—**Square D Co., 6060 Rivard St., Detroit 11, Mich.**

★ ★ ★

FOUR NEW WELDING ELECTRODES have been added to the "Perfection" line of accessories of this type: (1) Grade P-61 is shielded arc, general purpose straight polarity dc. electrode for welding mild steel in all positions and is designed especially for fast production where high currents are used and arc action is strong; (2) P-103 is shielded arc ac. electrode suitable for all position welding and also for welding low-alloy high-strength steels when these are used primarily for these properties. (3 and 4) P-170 and 180 are bare and wash-coated electrodes of straight polarity dc. type which have broad field of application where physical properties indicated in specifications are acceptable.—**The Anthony Carlin Co., 2717 E. 75th St., Cleveland, Ohio.**

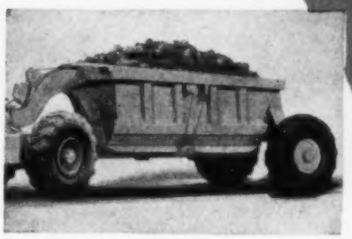
★ ★ ★

FORCE-FEED LOADER operates as companion tool to motor grader on highway maintenance or construction jobs, loading surplus earth, sod, rock, sand, oil mix and unruly materials into trucks for removal.



Also permits salvaging of valuable road surfacing materials for use on other jobs. One-man operated and travels under its own power at highway speed from one job to another. Removing windrows of debris thrown out from ditch cleaning is another job which may be assigned to this loader.—**Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Ill.**

HEIL
BULLDOZERS
(tailor-made to Cletrac Tractors)
have the rugged strength ... perfect balance ... full visibility that enables you to move more
PAY DIRT
every hour ... every day at substantial savings



A Bottom-Dump Trailer Wagon that is breaking all the SPEED records.

High-clearance doors that operate on the clamshell principle, enable your operator to dump and get away in a flash. The doors are *power-opened* — in 2 seconds — under cable control (they *close* by gravity). No doors dragging in the dirt — nothing to slow up the unit. The operator turns off the windrow at sharp angles whenever he chooses — dumping is under fingertip control — all in one heap, or with an even spread that looks almost like the work of a cable scraper. Get a postwar "priority" by ordering now!

Write for bulletins

Sound engineering design, reduced to the utmost simplicity, guarantees few service interruptions and cuts maintenance costs.

Note the operator's unobstructed view and the convenience of the controls that enable him to work accurately with no loss of speed. See how Heil engineers have pioneered the modern practice of replacing heavy cast members with welded box sections that are lighter, stronger, and easy to repair in the field without costly delays.

For full loads and more yardage — at lower cost—use Heil Earth-moving equipment. *Write for bulletins.* R-30

See Your Cletrac Tractor Distributor

ARMY NAVY
THE HEIL CO.
GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

"Gulf Quality Lubricants and Fuels help us get more yardage and lower maintenance costs"—

says superintendent D. L. McHugh

The grading contract of the H. E. Wolfe Construction Company, St. Augustine, Florida, on this airport project involves moving 1,500,000 yards of earth and 200,000 yards of muck. Hauls are from ½ to 1½ miles in length.

"Thanks in large part to the dependable and efficient operation of our equipment with Gulf products, we're well ahead of schedule on this rush Airport job."

MOVING between 30,000 and 40,000 yards of earth a day, the H. E. Wolfe Construction Company, St. Augustine, Florida, is ahead of schedule in grading operations on the airport project pictured above. The 200 units of equipment employed on this job are making an exceptional performance record with Gulf quality lubricants and fuels in service.

Like many other contractors doing rush war work throughout the country, the H. E. Wolfe organization has found that Gulf products provide maximum protection when equipment is pushed to the limit, and contribute to greater yardage. For Gulf lubricants and fuels are scientifically manufactured to meet the most exacting requirements.

Call in a Gulf Service Engineer before you start your next job—let him show you how Gulf products improve job efficiency and reduce maintenance costs. Write, wire, or phone your nearest Gulf office today.

GULF

GULF OIL CORPORATION · GULF REFINING COMPANY

GULF BUILDING, PITTSBURGH 30, PA.

Back the attack . . . buy more War Bonds!

This might have been your NEW shovel, but....

Your present equipment, working 'round-the-clock will last longer and continue to perform efficiently if these common-sense rules are followed:

- insure proper regular lubrication.
- provide daily inspection to detect troubles while they are still small
- make adjustments when needed—don't wait
- tighten loose bolts and nuts
- keep fuel, lubricants and water clean
- remove clutch and brake bands and clean lining with good grade of clear gasoline
- change cables end-for-end to increase life of wire rope
- plan work to favor machine
- inspect engine regularly—flush radiator when dirty
- always give model and serial numbers when ordering repairs
- contact your BAY CITY distributor for parts and service.

here again BAY CITY helps build an airfield in the South Pacific . .

Modern excavating and material handling equipment is playing an important part in forwarding the attack on fighting fronts all over the world. Just as this BAY CITY is loading coral for an airfield in the South Pacific, *your new equipment has gone to war.* And because there will be no new machine production released for civilian needs for the next 12 months or more, it is important that present equipment be kept in good operating condition. Look over the few simple, common-sense rules of maintenance that will lengthen the life of your shovel, dragline or crane. Apply these rules regularly. And if you are making plans for postwar equipment needs, write for literature on the fast, powerful, easy-handling BAY CITY which will some day be available with crawler or pneumatic tire mounting. BAY CITY SHOVELS, Inc., Bay City, Michigan.

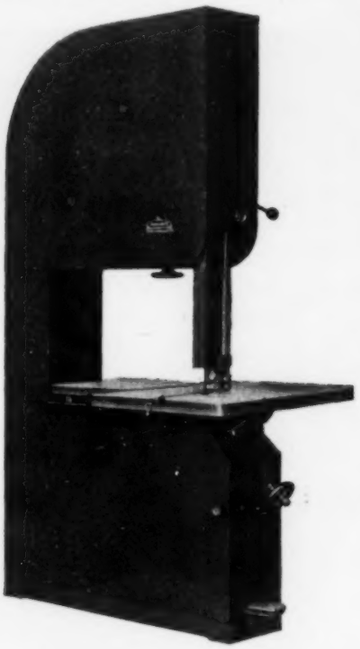
BAY CITY SHOVELS
12 Sizes
⅜ to 1½ Yard
Also truck mounted shovels and cranes

BAY CITY

SHOVELS • CRANES • DRAGLINES • TRENCH-HOES • SKIMMERS

WHEN SPLIT SECONDS Count!
To smash strafing planes coming in fast from any angle, self-powered multiple mounted machine guns enable gunners to concentrate on hitting the targets, while speedily and effortlessly the guns are swung around, raised or lowered. One more service stripe for the hundreds of thousands of Briggs & Stratton engines now with our armed forces.
THE urgent necessity of dependable power for purposes never before imagined, have revealed the amazing versatility of Briggs & Stratton 4-cycle, air-cooled gasoline engines. Their stamina, rugged dependability and superior performance under circumstances rarely encountered in peacetime, have demonstrated Briggs & Stratton high standards of quality in precision manufacture, and substantiated their recognition as "the world's finest air-cooled gasoline engines."
Our years of experience in design and production of air-cooled engines is again available to you on present problems or in your planning for postwar gasoline engine requirements.
"It's powered right—when it's powered by Briggs & Stratton."
BRIGGS & STRATTON CORP.
MILWAUKEE 1, WISCONSIN, U.S.A.
BACK THE INVASION
BUY WAR BONDS
4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

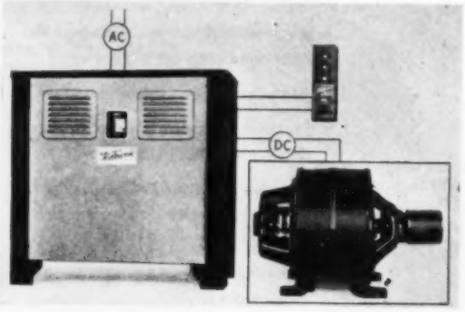
36-IN. BAND SAW, Model X40, built for high speed, accurate production and hard service, has following features: (1) Main frame, one piece cored casting, providing support and preventing deflection and vibration; (2) motor base cast integral with frame; (3) hand wheel tilts table, pointer registering automatically degree of tilt with positive stops



at 45 deg. right and 5 deg. left; (4) wheels running at 900 rpm. are steel disk type, dynamically balanced with demountable and interchangeable rims and removable heavy steel-reinforced rubber tires; (5) blade balanced by straining spring for shock absorption, and scale indicates proper tension for different widths of blade; (6) ballbearing, roller-type saw guides permitting high speeds and insuring long wear; (7) external toggle lever type mechanical foot brake with automatic cut-off switch which acts instantly upon slightest pressure; (8) spot-welded sheet steel guards inclose wheels and sliding guards inclose saw above roller guide and at back of column; (9) direct drive 5- or 7½-hp. motors.—**American Saw Mill Machinery Co., Hackettstown, N. J.**

★ ★ ★

ADJUSTABLE SPEED ELECTRONIC DRIVES providing dc. motor performance from ac. power without requiring special motors, is applicable to any machine driven by a dc. shunt motor. Electronic rectifier tubes are employed to convert ac. to dc., supplying separate power to the dc. motor armature and field circuits. Each circuit is individually controlled through other electronic tubes to provide speed adjustment and current regulation.



Let's Get at the HEART of the MAINTENANCE Problem!

★ SURE! . . . you use the best lubricating oils money can buy . . . your motors are equipped with oil filters, and you have the crankcases drained frequently. BUT, layups of valuable equipment continue, man hours are lost, gas and oil wasted . . . and MAINTENANCE COSTS SOAR UPWARD!

★ This COULD BE because the type of oil filter Elements you are now using do NOT have the capacity to do a complete and thorough job of removing harmful dirt, grit, metal particles, carbon, sludge, varnish, resin and acids that bind piston rings, corrode bearings and cause excessive MOTOR WEAR!

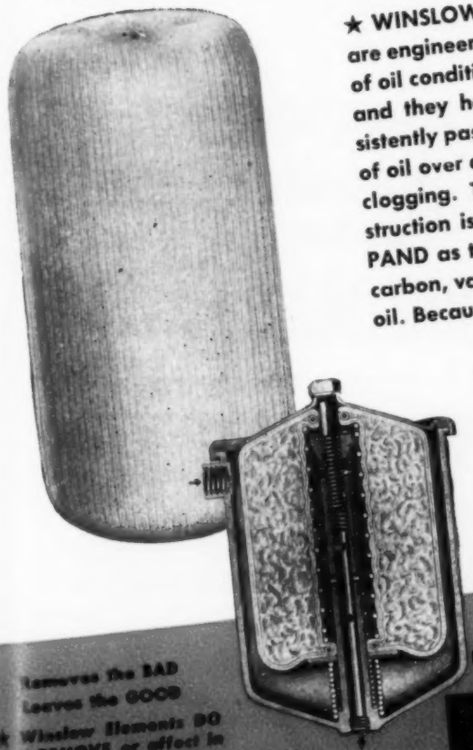
Here's What Goes On Inside Your Motor

These two pictures of the same piston show what goes on inside an engine equipped with a conventional type oil filter and what happens after this filter is replaced with a Winslow Oil Conditioner.

DIRTY OIL means a dirty engine with gummed-up pistons and stuck rings. CLEAN OIL means a CLEAN engine with pistons bright and rings free.

The picture at left shows the piston coated with varnish and the rings completely sealed by carbon. At right is shown the same piston after running for a period in the same engine equipped with a Winslow Oil Conditioner whose elements were replaced as needed. The varnish is gone, the rings are free and compression restored. The same general clean-up took place on all working surfaces throughout the engine. IT PAYS TO KEEP ENGINES CLEAN WITH WINSLOW.

WINSLOW OIL CONDITIONING *Means Cleaner Engines!*



★ WINSLOW REPLACEMENT ELEMENTS are engineered to do an outstanding job of oil conditioning in heavy duty motors, and they have the CAPACITY to consistently pass and CLEAN a large volume of oil over a long period of time without clogging. Their patent-protected construction is such that they actually EXPAND as they remove dirt, grit, sludge, carbon, varnish, resin and acid from the oil. Because of this expansion, Winslow Elements retain their porosity and oil cleaning efficiency much longer. They clean up engines and keep 'em clean!

HIGH CAPACITY LONG LIFE

WINSLOW SALES CO.
406 Montgomery St., San Francisco 4, Calif.

Write or wire for Franchise Information.

Removes the BAD
Leaves the GOOD

★ Winslow Elements DO NOT REMOVE or affect in any way the valuable ADDITIVES which give modern compounded oils their high lubricating efficiency.

WINSLOW

OIL FILTERS • CONDITIONERS • ELEMENTS

A Product of
Winslow Engineering Co., Oakland 8, Calif.

Answers to Everyday Questions about PREformed WIRE ROPE

1 *Is PREformed a lay of rope?*

2 *Is PREformed a special construction?*

3 *Just what does PREformed mean?*

4 *How shall I mark my orders to get PREformed?*

These are questions wire rope users are asking. Here are answers to everyday questions we receive.

First, let us be reminded that there are two kinds of rope. One is non-preformed wire rope, the kind that has served users for many years. Then there is PREformed, the kind which is newer, better, and longer lasting. Because it is a newer type rope, because it does a much better job for users, there are many questions asked about it. Let's consider a few.

FIRST . . . *"Is PREformed a lay of rope?"*

No. PREformed does not refer to a lay of rope. Lay refers to the twist or helical form which is characteristic of *all* wire rope. A rope may be Lang Lay, Right Lay, Left Lay, Reverse Lay . . . and each of these lays may be made either PREformed or non-preformed.

Lang Lay ropes should always be PREformed to counteract the tendency towards twisting, because wires and strands are both laid in the same direction in Lang Lay ropes. Further information on Rope Lay is given in the new Macwhyte Wire Rope Catalog, G-15.

SECOND . . . *"Is PREformed a special construction?"*

No, PREformed is not a special construction. Construction refers to the number and arrangement of wires in the rope . . . such as 6 x 17 (six strands of 17 wires each), 8 x 19 (eight strands of nineteen wires each), and so on. These constructions can refer to either PREformed or non-preformed wire rope. (For complete data on constructions, see Catalog G-15.)

THIRD . . . *"Just what is PREformed?"*

Macwhyte PREformed wire rope is the proper size, grade and construction you need, *PLUS*. This *plus* refers to the PREforming, a process which forms the wires and strands into a spiral, so that wires and strands lie naturally in place with a minimum of internal stress.

Illustration above tells the story. Notice how the wire has a special shape? It has been PREformed. When the rope is closed (put together in the closing machine), both wires and strands naturally fall into position in the rope.

Illustration above points to the end of a PREformed rope showing how wires lie naturally in place even though no seizing is there to hold them.

The result is a wire rope that is more flexible and that more quickly adapts itself to the equipment on which it is used. Thus, literally, PREforming means better PER-forming on the job.

A PREformed rope is safer to handle, too, because broken wires (which will happen after *long* usage) do not wicker out as in non-preformed wire rope.

FOURTH . . . *"How should I mark my orders to get PREformed?"*

Just add the words "Macwhyte PREformed" to your specifications. Like this, for example:

1,250 feet 1" 6 x 19 Lang Lay with IWRC, Macwhyte PREformed Monarch Whyte Strand wire rope.

If you leave out "Macwhyte PREformed," the specification then becomes a non-preformed wire rope specification. The reason? When PREformed is not mentioned on the order, it is a standard practice to supply non-preformed.

FIFTH . . . *Internal Lubrication, too!*

And a bonus *Plus* feature of Macwhyte PREformed wire ropes is *internal lubrication.* Not only are wires and strands PREformed, but each wire in the strands is coated with an elastic, non-drying film of lubricant, as explained on pages 10 and 11 of G-15 catalog.

We have been making wire rope for equipment like yours for many, many years. The benefit of that experience is yours for the asking. You can be assured, too, that when you select Macwhyte you are not only getting "the correct rope for your equipment," but also a personal interest in helping you get the *most* out of *your* rope.

MACWHYTE PREformed WIRE ROPE — *Plus* Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 741

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

2941 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

MAINTENANCE COSTS HELP DECIDE PAVING JOB PROFITS!

The maintenance cost per yard of concrete produced is an important consideration in the ultimate cost and paving job profit. Construction machinery should be selected for its ability to "take it" and then come back for more. Ransome Pavers are provided with ample strength and top quality from crawler pad to water tank . . .

. . from boom tip to skip end. The result of many years of continuous improvement, today's Ransome is at work on 'round-the-clock war jobs and ready for the post-war future . . . Consider a Ransome for your next paving job. We will be glad to supply more reasons why.

CONSTRUCTION EQUIPMENT DIVISION

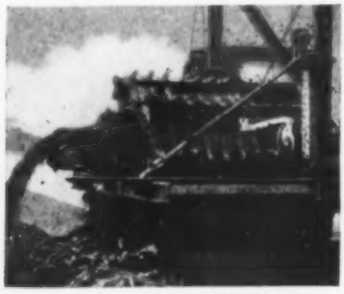
Ransome MACHINERY COMPANY

DUNELLEN, NEW JERSEY

SUBSIDIARY OF WORTHINGTON PUMP AND MACHINERY CORPORATION

Hungry for yardage

YOU CAN SEE what these ditcher teeth are up against! Trenching in sandy soil! Yet, because of their abrasion-defying hard-facing of Coast Metals, they serve better, last longer!



These Ditcher Teeth Stay Square-Cornered, Sharp-Cutting LONGER

And at a surprisingly low cost,—in comparison both with new teeth replacements and with other hard-facing materials. Here, the saving over the hard-facing material formerly used was 40%!

COAST METALS HARD-FACING is your best answer to tough maintenance problems. Applied to road graders, levelers, bulldozers, slip scrapers,—in fact to all blades, cutters and scoops on equipment of this type for cutting, scraping, digging and loading earth, it makes your equipment last several times longer.

COAST METALS, INC.
Plant and General Offices: Canton, Ohio
Executive Offices: New York, N.Y.

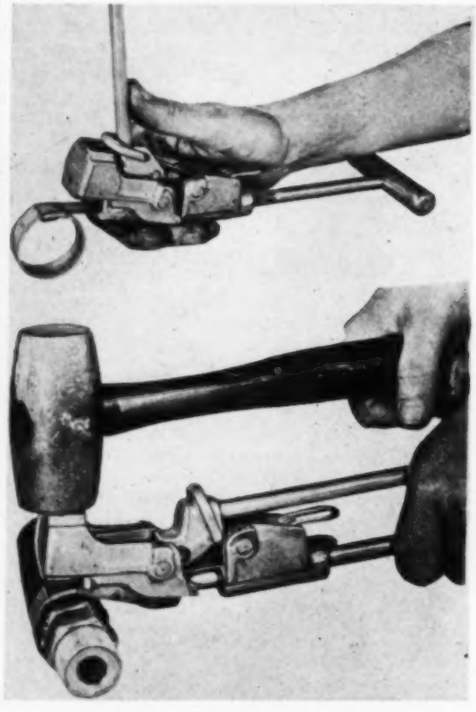
COAST METALS *hard-facing weld rods*
YOUR EQUIPMENT'S LIFE PRESERVER AGAINST WEAR

Construction Speeded
with the
New
CLIPPER
HOIST
FREE
TRIAL
on Your
JOB
PORTABLE AND EASY TO OPERATE
You'll want the New Portable Clipper Hoist on your Job ... Quickly set up ready for use. The Clipper Hoist is operated by only one man!
FEATURES AUTOMATIC UNLOADING
FASTER ... Brick, tile, concrete and flue lining can be hoisted to greater heights, without fatigue.
FLEXIBLE ... Practical for every job.
THE CLIPPER MANUFACTURING COMPANY
4040 CHOUTEAU
ST. LOUIS, MO.
District Offices and Warehouses: Philadelphia, Kansas City, Austin, Tex.

This method of controlling armature current prevents excessive current ripples, according to the manufacturer. Full field strength of the motor and limited armature current are utilized in starting in order that maximum torque may be had without causing excessive power-line surges and the consequent interference with other equipment drawing power from the same distribution system. Capacities are available from ½ to 3 hp. single phase and 5 to 10 hp. three phase as standard, and other sizes or special designs for specific applications can be supplied. Standard voltages are 220/440 at 60 cycles, 350 v. and 25 or 50 cycle machines can be supplied.—**Weltronic Co., 20735 Grand River, Detroit (19), Mich.**

★ ★ ★

HOSE CLAMP, trade name "Punch-Lok," is a mechanical device used to connect various kinds of male and female fittings, special nipples, menders or ordinary pipe to a hose. Connection is claimed to be as strong, or stronger, than the hose itself. Once the Punch-Lok hose clamp has been



locked, vibration or rough handling will not loosen it. For all ordinary commercial pressures a single hose clamp is sufficient, while two clamps and a double groove fitting are recommended wherever the fluid handled by the hose is dangerous, such as steam, chemical solutions and hot liquids. Clamps up to 48 in. in dia. can be applied with a portable tool weighing only 2½ lb.—**Industrial Products Sales Div., B. F. Goodrich Co., Akron, Ohio.**

★ ★ ★

TWO-TERMINAL TWIST-LOCK RECEPTACLE (15 amp., 125 v., or 10 amp. 250 v.) designed for installation in No. 2100 Plugmold still further extends the utility of this "plug-in-anywhere" convenience wiring system for industrial applications along work benches, inspection racks, and assembly lines for plugging in hand tools and test apparatus appliances for work lights.—**The Wiremold Co., Hartford, Conn.**

Keep Your Lubricants *Clean!*

Dirt and grit and similar abrasives which are allowed to creep into the lubricant to grind and damage your equipment, are Fifth Columnists.

They are often the causes of failures for which something else is unjustly blamed. Guard your vitally important excavator against such **preventable** operating interruptions. Keep it working for victory.

THESE SIMPLE PRECAUTIONS WILL INSURE CLEAN LUBRICANTS:

1. Be sure oil and grease comes to you clean.
2. Keep lubricants covered and stored neatly in a clean place.
3. Drain oil enclosures when hot so the draining oil carries off the sludge.
4. Keep funnels, plugs and oil spouts clean. Wipe off oil can covers before removing.
5. Keep empty containers that are to be refilled clean and tightly covered.
6. Clean enclosure covers before removing for inspection.
7. Clean outside of grease gun before using.
8. Clean fittings so that grit is not forced in with grease.
9. Be sure gun is thoroughly cleaned before changing type of grease.
10. Keep your machine clean always.

Bucyrus-Eries are the finest excavators that modern engineering can build. Good lubrication regularly, carefully and cleanly applied will protect their easy, smooth, high speed operation in the vital tasks they are performing in winning the war.

ARMY E NAVY

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

HERCULES ROLLERS

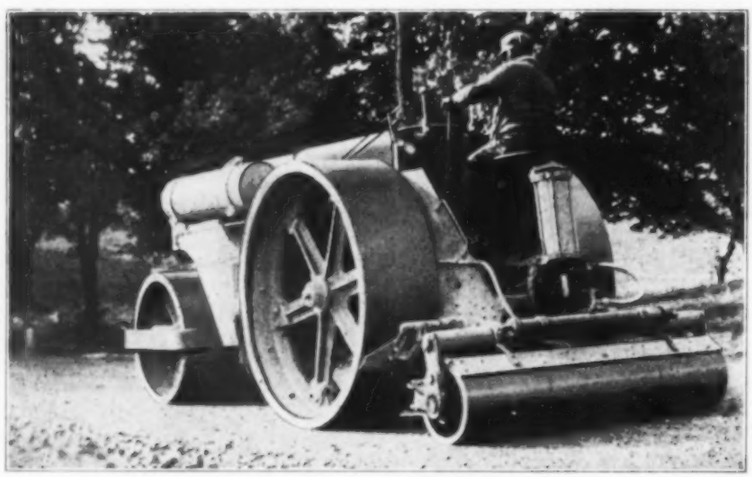
have moved to

BUCYRUS — OHIO

From new headquarters in Bucyrus, Ohio, The Hercules Roller Company is prepared to furnish repairs and service information on HERCULES Rollers in the field, promptly and efficiently. Let us know your maintenance, repair or rolling problems and we will gladly help solve them, either from the factory or through our authorized distributors.

And when making those all-important, blueprinted plans for the future, remember there's a HERCULES Roller for every postwar construction job. Wherever a highway, bridge, airport or dam is being built — that's "home" to a HERCULES Roller or *IRONEROLLER*. Build with fine machinery for fine results!

THE HERCULES ROLLER COMPANY
BUCYRUS — OHIO



Chemical Treatment Makes Wood Harder and Stronger

A CHEMICAL MEANS of converting ordinary wood into a whole new range of usefulness, now available for war purposes and offering many post-war applications, was announced April 17 by E. I. du Pont de Nemours & Co., Wilmington, Del. Using chemicals derived from coal, air, and water, the process, described by Dr. J. F. T. Berliner, makes timber markedly harder, stronger, stiffer, and more durable. It eliminates its natural tendency to swell, shrink, or warp with changes in humidity, and prevents the grain from rising when moistened. Color also may be imparted permanently throughout the wood by mixing a dye with the impregnating chemical. Veneers sufficiently treated become self-bonding. They require no adhesive to be formed into plywoods, since heat and pressure fuse the product into a hard, dense substance.

How Changes Are Effected

Methylolurea, the chemical agent that effects these fundamental changes, is impregnated into the structure of wood in

(*Continued on page* 102)

UNTIL THE LAST GERMAN CRIES "KAMERAD"

the U. S. Engineers need BYERS cranes more than civilians do . . . and the Engineers are getting them

In the meantime, owners of current and older models of Byers shovels and cranes may depend on Byers Parts Service to help them keep present equipment working steadily and satisfactorily.

BYERS CRANES AND SHOVELS
RAVENNA, OHIO
DISTRIBUTORS THROUGHOUT THE WORLD

The Story of 4,000 RUDDERS

Since the wartime shipbuilding program got under way Bethlehem's Fabricated Steel Construction Unit has been supplying parts and subassemblies to the nation's shipbuilders.

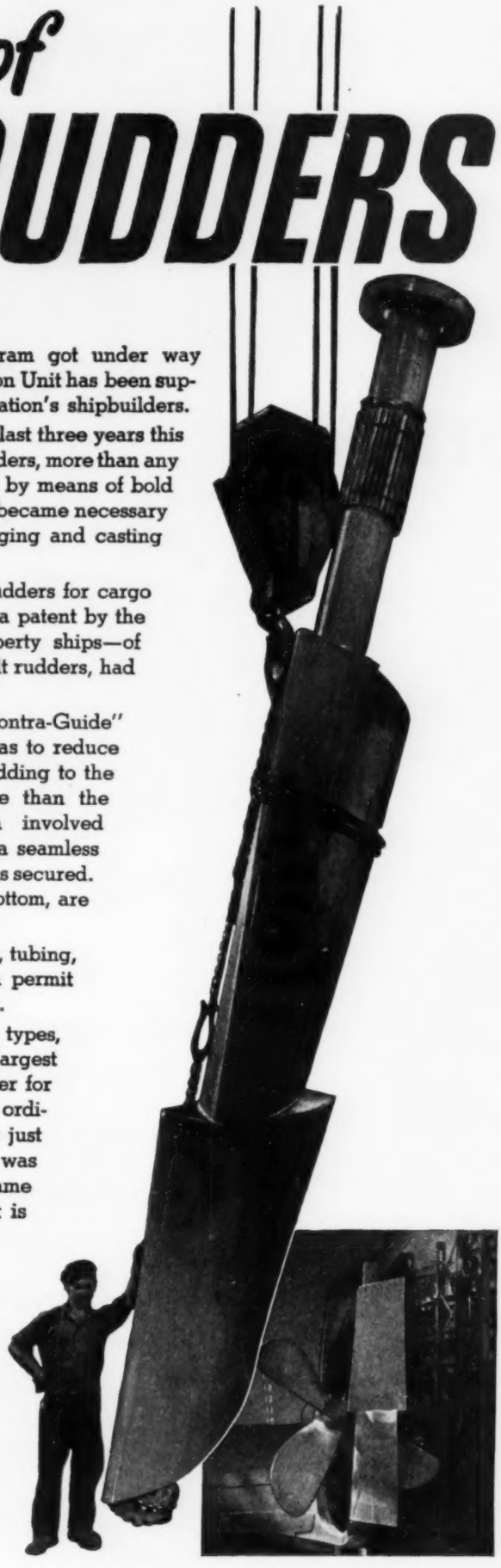
Take rudders, for example. During the last three years this organization has built about 4,000 ship rudders, more than any other single maker. And it has built them by means of bold new techniques which were evolved after it became necessary to abandon, successively, conventional forging and casting designs.

In 1941, Bethlehem began building 60 rudders for cargo ships for Britain. The same design, based on a patent by the Goldschmidt Corporation, was used for Liberty ships—of which some 2,100, all carrying Bethlehem-built rudders, had been produced by the end of 1943.

These 8-ton, 18-ft. rudders are of the "Contra-Guide" type, with two sections so shaped and related as to reduce rudder drag caused by propeller action, thus adding to the ship's speed. Lighter and cheaper to produce than the standard pre-war streamlined rudder, which involved forging operations, the Contra-Guide consists of a seamless steel tube, and horizontal ribs to which skin plating is secured. The rudder stock at the top, and the pintle at the bottom, are castings.

The whole rudder is built up by welding the plates, tubing, castings, etc., in special jigs and positioners which permit rapid production of identical, interchangeable units.

Bethlehem has built hundreds of rudders of other types, for naval as well as merchant vessels. But its second largest rudder job has been to produce a Contra-Guide rudder for tankers, which is built on extra-large steel frames that ordinarily would be cast. However, casting facilities being just as tight as those for forging, an all-welded rudder was evolved, constructed entirely of rolled steel. This became the basis for a rudder for the new Victory ship—and it is now being produced in quantity in Bethlehem shops.



★ ★ ★ BETHLEHEM STEEL ★ ★

The LaFayette—1837. One of the earliest B & O locomotives to haul the trains of the Presidents of the United States.

PREFACE OF A NEW ERA

GM Diesels have the exacting job of hauling B&O's highest-class freight, including trains of perishables and other foodstuffs for the armed forces as well as for civilian markets.

KEEP AMERICA STRONG BUY WAR BONDS

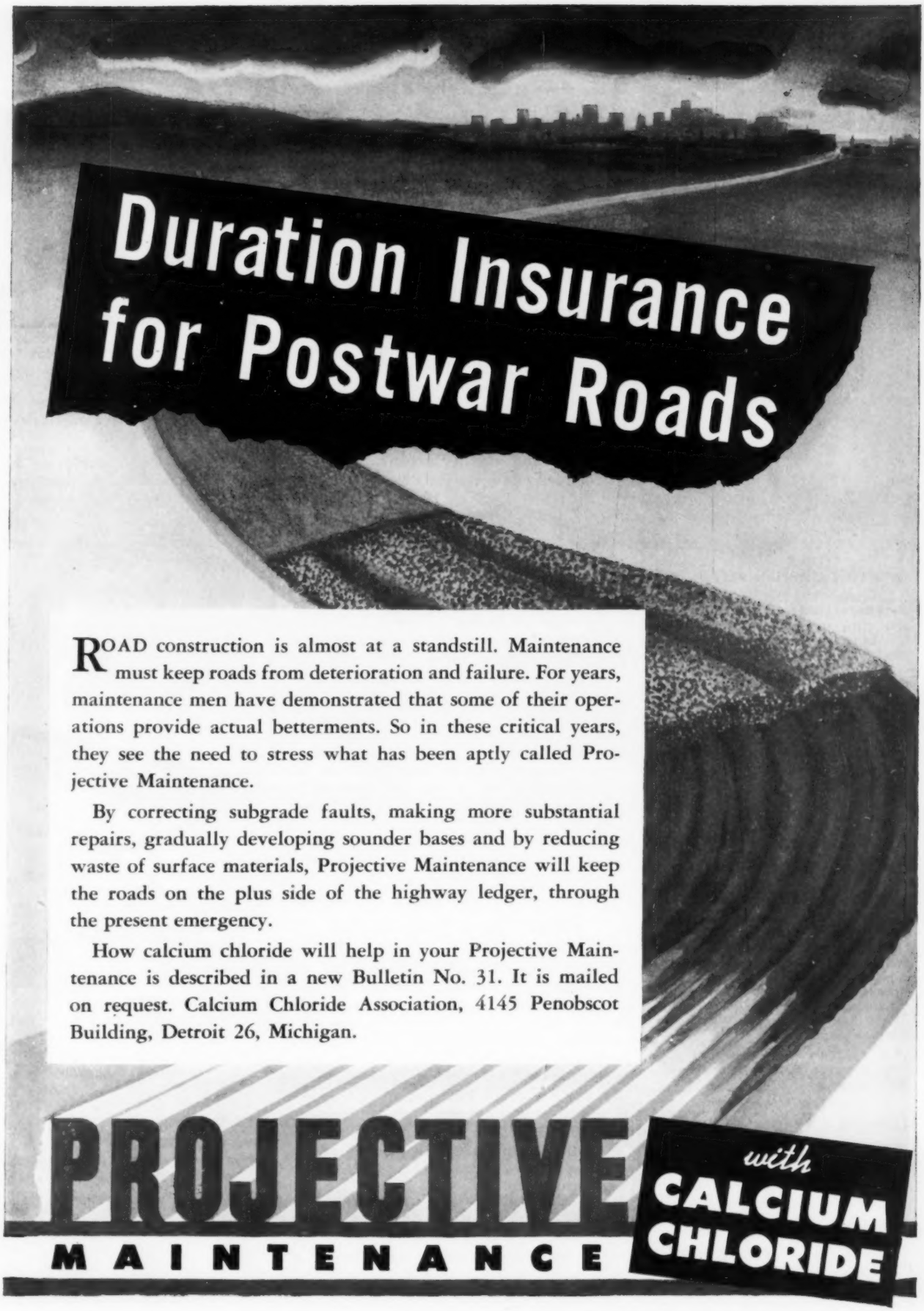
DAY in and day out, General Motors Diesel Locomotives are proving their ability to haul huge loads far, fast, with little attention and at low cost. In any vision of the future of transportation, these tireless giants must loom large. Already they have won a place of rare importance by their unprecedented performance in the work of the railroads at war.

GM
GENERAL MOTORS
DIESEL POWER

LOCOMOTIVES.....*ELECTRO-MOTIVE DIVISION, La Grange, Ill.*

ENGINES..*150 to 2000 H.P.*...*CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio*

ENGINES.....*15 to 250 H.P.*.....*DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.*


Duration Insurance
for Postwar Roads
ROAD construction is almost at a standstill. Maintenance must keep roads from deterioration and failure. For years, maintenance men have demonstrated that some of their operations provide actual betterments. So in these critical years, they see the need to stress what has been aptly called Projective Maintenance.
By correcting subgrade faults, making more substantial repairs, gradually developing sounder bases and by reducing waste of surface materials, Projective Maintenance will keep the roads on the plus side of the highway ledger, through the present emergency.
How calcium chloride will help in your Projective Maintenance is described in a new Bulletin No. 31. It is mailed on request. Calcium Chloride Association, 4145 Penobscot Building, Detroit 26, Michigan.
PROJECTIVE
MAINTENANCE
with
CALCIUM
CHLORIDE

SLINGS CAN'T SLIP OFF!

Laughlin Safety Hooks have a unique latch designed to prevent loads from slipping or jolting off the hook. Green workers can work with less fear of accidents . . . older hands will appreciate this safety feature. Laughlin's Safety Hooks are made of heat-treated, drop-forged steel.

OTHER LAUGHLIN FITTINGS

Laughlin offers you the most complete line of hoist hooks on the market, and there are standard Laughlin fittings for almost any other requirement.

ROPE SOCKETS

Rope sockets of drop-forged steel are available in sizes ¼" to 1¾" (open pattern) and sizes ¼" to 1¾" (closed pattern), plain or galvanized finish.

WELDLESS TURNBUCKLES

Weldless Turnbuckles are available in all types and sizes from ¼" x 4" to 2½" x 36". The largest turnbuckle ever made by drop-forging was produced by Laughlin . . . a giant of 440 pounds for a 50 ton boom.

Laughlin's latest catalog shows the complete line of Laughlin Wire Rope Fittings. Send for it.

Distributed through
Mill, Mine, and Oil Field Supply Houses
Look for Laughlin Products in
Power's Road & Street Catalog

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN Company
PORTLAND 6, MAINE

(Continued from page 98)

a water solution. Methylolurea reacts with components of wood to form hard, water-insoluble, unmeltable resins within the piece of lumber being treated. Natural acids present in timber initiate the reaction. Heat, such as kiln drying, speeds the conversion of the methylolurea into resins within the wood. The process takes place with sufficient rapidity at normal temperatures to be completed in the usual air drying operations. A permanent resin that is both hard and insoluble is developed either at normal or kiln temperatures. The process appears to be applicable to large items such as structural timbers as well as to items as small as smoking pipe stems and musical instrument reeds. Such woods as soft maple, tupelo gum, yellow poplar, a number of the pines and other woods can be treated to improve their usefulness. They could be used to release hard maple, oak, walnut and other more desirable but less available and costlier woods. In turn these woods, too, can be improved.

Other Uses of Treatment

The treatment may also be used to "case harden" wood. For timbers and lumber required for the construction of trestles, towers, and buildings, the treatment may be applied to leave untreated inner fibers in a more resilient, flexible state to withstand impact stresses while a hardened, dent-resisting, high strength shell is produced on the surface. This would allow the lumber to bear heavier loads or, conversely, would permit lighter construction. Outer zone treatment would improve dimensional stability of the treated piece, would increase flame resistance and resistance to rot and insect infestation.

★ ★ ★

Three New Slide Rules

THREE NEW SLIDE RULES—one for the professional draftsman, one for the apprentice draftsman or student, and also a handy 5-in. pocket slide rule—are now available to engineering, drafting, accounting estimating and sales departments, according to announcement made by The Frederick Post Co., of Chicago.

All three of the rules contain the scales A, B, C, D, CI, K, S, L and T. With the exception of the apprentice rule they are celluloid faced. The apprentice rule has a painted face.

These rules have been produced as an emergency measure to meet the tremendous demand. They are well constructed, accurate slide rules and come equipped with a case and instruction sheet on the complete operation of the slide rule.

Save Metals . . . Speed Wire Rope Work . . With a

FIST-GRIP

The "Fist-Grip" Clip Has 3 Strikes on Hitler

Saves accidents — can't be put on wrong; doesn't weaken rope; greater holding power.

Saves metals — 25% fewer clips do the job better; no crushed rope ends; flush nuts — no battered threads.

Save time — fewer clips to put on; nuts on opposite sides tighten easier, faster with any type wrench.

Greater holding power with 25% less clips!

"Finger-Pinch". U-bolt clips unavoidably crimp, distort and bow wire rope, causing reverse strains when load is applied.

"Fist-Grip". Fewer Safety Clips hold rope straight in smooth, vise-like grip, with no protruding threads to get battered in use. Clips and rope can always be used on the next job.

Distributed through
Mill, Mine, and Oil Field Supply Houses

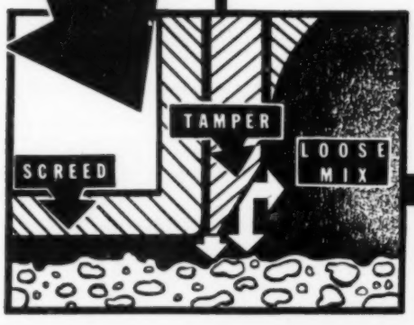
FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN Company
PORTLAND 6, MAINE

Asphalt Tampers

Joe was an early model asphalt tamper. Wearing his heavy wooden shoes, Joe got out on the hot, steaming mat and pounded down the spots around manholes and gratings that had to have tamping while the mix was hot. His boss used to wisecrack that Joe knew asphalt from the ground up. That's why he's running a Barber-Greene Finisher today—Joe knows the value of tamping while the mix is hot.

Joe is tamping 1200 strokes a minute now. Tamping the mix hotter than he could walk on it, even with his wooden clogs, while it is in the best workable condition. The roller that follows Joe and his B-G Finisher adds about an eighth inch final compaction. And the depressions are full of compacted material, not struck off material that will compress under traffic and repeat depression on new surface.



The bevelled face of the tamping bar does the actual compacting. It pushes the material forward as well as down, forcing the hot mix into the voids and produces a dense mat. The travel of the tamper imparts a rolling movement to the loose mix in the spreading chamber which prevents any segregation of material. The follow-up screed is level with the bottom stroke of the tamper bar and adds its weight to compacting the mat.

44-9

BARBER GREENE

ARMY E NAVY

AURORA, ILL., U. S. A.

Time Is Money!

SAVE IT IN

BIG CHUNKS

To get the job done faster, depend on

VIBER

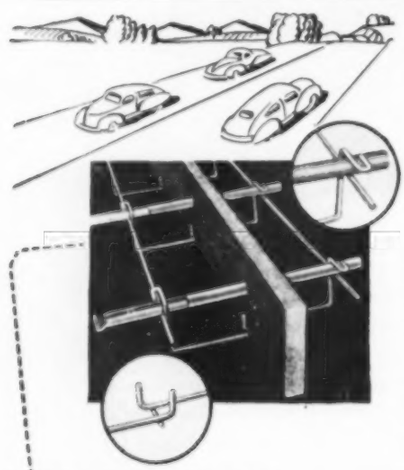
Concrete Vibrators

High speed—9500 RPM in concrete! Powerful, rugged, portable, interchangeable Vibers help beat schedules.

Step up profits by "Viberating" that next job. For full details send for latest catalog NOW.

VIBER COMPANY

726 South Flower Street
BURBANK, CALIFORNIA



LIVES UP TO ITS NAME

"QWIK-LOCK"

Expansion Joint Assemblies

EASY INSTALLATION—
FOOLPROOF FUNCTIONING

● Speed up road building—use "QWIK-LOCK". Easy to position and lock dowels—parallel to each other and to the subgrade. Result: A better job at lower cost.

Write for Catalog of Construction Accessories . . . See Our Section in SWEET'S

UNION STEEL PRODUCTS COMPANY
417 Pine Street • Albion, Michigan

Concrete & Building Specialties, Ltd.
2354 Danforth Avenue
Toronto, Canada

Williams Wallace Company
160 Hooper Street
San Francisco
California

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.

FLEXIBLE SHAFT COUPLINGS—**Diamond Chain & Mfg. Co.**, Indianapolis (7), Ind. (7 pp. illustrated) Revised edition of Bulletin No. 12 explains advantages of Diamond roller chain coupling and illustrates many of its applications. Horsepower rating and dimensions and weights are given with prices for both couplings and casings.

★ ★ ★

AUTOMOTIVE PRODUCTS—**J. W. Speaker Corp.**, Milwaukee, Wis. (14 pp. looseleaf, illustrated) New wartime catalog of all products of this company available for immediate distribution. It is especially timely because it offers line-up of tire and tube repair equipment which is vital to war's rubber conservation needs. Lists types of vulcanizing repairs for both natural and synthetic rubber that are now available for civilian use.

★ ★ ★

ENGINEERING DATA FOR V-BELTS—**Goodyear Tire & Rubber Co.**, Akron, Ohio. (33 pp., illustrated) New and authoritative pamphlet for information of engineers and engineering departments reprinted from Goodyear's "Handbook of Belting." Contains complete details on care and installation of all types of V-Belt drives. One section is devoted exclusively to new steel cable V-belts. Publication of this section dealing with V-belts only was prompted by current national efforts to conserve paper and manpower.

★ ★ ★

GAS WELDING AND CUTTING APPARATUS—**Victor Equipment Co.**, 844-54 Folsom St., San Francisco, (7) Calif. (36 pp., illustrated) Describes and illustrates various units of Victor line of welding and cutting equipment with many on-the-job photographs showing applications in wartime plants. One section is devoted to General Electric welding apparatus, for which this company is exclusive distributor in the states of Arizona, California and Nevada. Another section describes and illustrates Thomson-Gibb line of resistance welders. The latest types of safety clothing for welding operators are described and shown.

Here are 10 basic books of day-in-day-out value in ONE low-priced volume

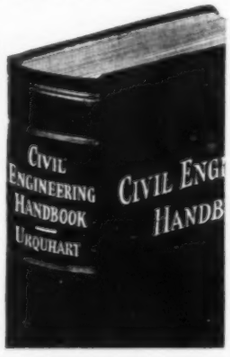
This book is carefully planned to give the information needed by men who actually plan, select, design, and construct civil engineering structures and projects—in one compact volume and at a reasonable price. The new 1940 edition blends theory, practice and fundamentals equally; and answers your questions in *any* division of civil engineering.

CIVIL ENGINEERING HANDBOOK

Editor-in-chief: L. C. Urquhart, Professor of Structural Engineering, Cornell University. **2nd Edition.** 870 pp., illus., $5.00. Here are the fundamentals of the various subdivisions of civil engineering for the use of practicing engineers confronted with specific problems, particularly those outside their specialized fields. The book offers you ten complete treatises on the ten major subdivisions of civil engineering, each written by a specialist of international reputation in his field.

10 BIG SECTIONS

- Surveying
- Railway and Highway Engineering
- Mechanics of Materials
- Hydraulics
- Stresses in Framed Structures
- Steel Design
- Concrete
- Foundations
- Sewerage and Sewage Disposal
- Water Supply and Purification



SEE IT 10 DAYS

SEND THIS McGRAW-HILL COUPON NOW

McGRAW-HILL BOOK CO., INC.
330 West 42nd Street, New York 18, N. Y.

Send me Urquhart's Civil Engineering Handbook for 10 days' examination on approval. In 10 days I will send $5.00, plus few cents postage, or return book postpaid. (Postage paid on orders accompanied by remittance.)

Name .....

Address .....

City and State .....

Position .....

Company ..... CM. 6-44

(Books sent on approval in U. S. and Canada only.)

The Ohio Locomotive Crane Company

USES A

Climax R6I ENGINE

TO POWER THIS OHIO CRANE

This Climax R6I, used on the crane below, is a 6 cylinder, valve-in-head engine which develops 180 h.p. at 1200 r.p.m. and burns natural gas, manufactured gas, butane or gasoline.

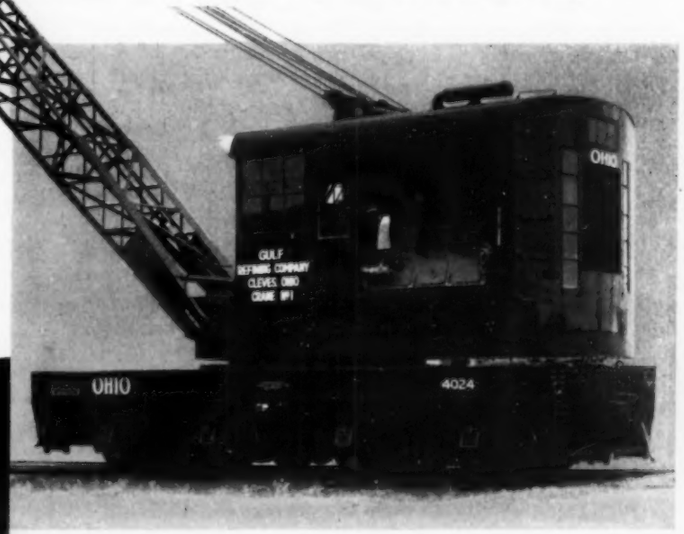
Cool running is assured by the deep, widely-spaced water passages which surround the cylinder heads and full length of stroke. Operation is possible over a wide speed range without encountering criticals. The low piston speeds and compression ratios guarantee minimum upkeep cost and long engine life.

Climax R6I maintenance is inexpensive and easy, and can be done by any local mechanic. The overhead valves make grinding simple, and there are no extremely close tolerances to be made. The cylinders are cast with walls of sufficient thickness to permit several reborings.

Here is the power plant for YOUR crane, shovel, dragline snow-plow, pump or other equipment.

For stationary or mobile drives; belt, chain or direct-connected, the Climax R6I gives you 166 h. p. at 1200 r. p. m.

The Climax R6I Blue Streak Combustion Chamber gives unusually high horsepower output on little fuel. This chamber causes complete gas mixing and more efficient scavenging, which steps up power delivery and reduces detonation and power losses when the engine operates under sudden or periodic overloads.



"For High Achievement in the Production of War Material"

Climax Engineering Company

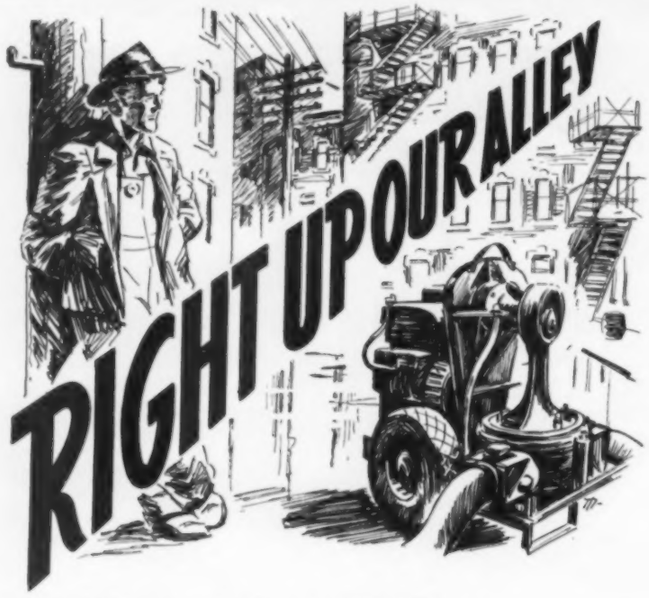
GENERAL OFFICES & FACTORY:

CLINTON, IOWA

REGIONAL OFFICES: CHICAGO, ILL., DALLAS, TEXAS

CLIMAX ENGINES are 4, 6, 8 and 12 cylinder gas engines with ratings from 40 to 495 h.p. Climax Diesel engines are made in two models rated at 22 and 44 h.p. The gas engines operate on natural gas, butane, or gasoline. The Diesels use standard grade fuel oil.

WRITE FOR INFORMATION— to Climax Engineering Company, 1807 South Fourth St., Clinton, Iowa.



THE ROAD TO VICTORY IS RIGHT UP OUR ALLEY . .

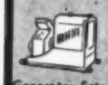
. **BECAUSE:** We didn't have to convert to War Production. Novo's Line of Construction Equipment met Army and Navy Specifications. In fact, it was just what Uncle Sam ordered . . . and he ordered plenty of it! The same high-quality Novo Engines, Pumps, Hoists, and Generator Sets that you have used for years were ready for war by merely donning a uniform of G.I. paint. Yes, when the enemy struck the Novo Line was ready for the Front Line.

THEREFORE . . There will be no idle period of reconversion. Novo Construction Equipment, better for having served in the Armed Forces, will be ready and available to carry on your peacetime business. So, plan your Post War Prosperity on a solid foundation, built on Novo Construction Equipment.

We are currently in production on all items illustrated at the right. While most of our production is reserved for the Armed Forces, we can make limited shipment to Civilians with proper Priority.

Also a member of A.E.D.

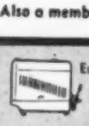
Diaphragm and Pressure Pumps


Generator Sets

Hoists

Self Priming Pumps

Pavement Breakers


Engines

NOVO ENGINE COMPANY

LANSING, MICHIGAN

NOVO ENGINE COMPANY, 200 Porter St., Lansing, Mich.

Please send me your Consolidated Catalogue, No. 4-43, on Novo's Complete Line of Construction Equipment.

NAME:_____

ADDRESS:_____

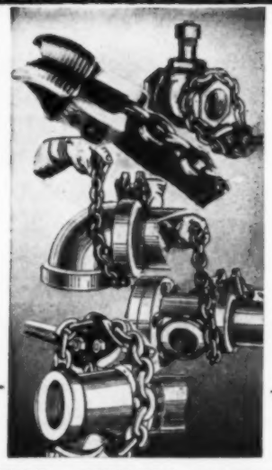
WELDERS GUIDE—**Mir-O-Col Alloy Co.,** 2416-30 E. 53rd St., Los Angeles 11, Calif. (28-p. booklet) Successful acetylene and electric hard surfacing technique is carefully explained in this booklet under the following headings: "How to Judge a Hard Surfacing"; "How to Figure Economy in Hard Surfacing"; "Correct Size of Rod to Use"; "Hard Surfacing—the Indispensable Resistor for Abrasion"; "Melting Point"; "Abrasion, Friction, Vibration, Impact"; "Deposition"; "Red Hardness"; "Checking"; "Insufficient Heat"; "How to Start an Electric Weld"; "Electric Process"; "Acetylene Application"; "Procedure"; "Things to Remember"; "The Square Inch Area Covered by One Pound of Metal"; "How to Equalize Stresses from Expansion, Upsetting and Contraction"; "Jigging and Preparing a Job"; "Heat Treatment"; "Hard Surfacing Cast Iron"; "List of Applications." A 4-p. folder treats the same subject in abridged form.

★ ★ ★

CALCULATING CHAIN DRIVE CENTERS AND LENGTHS—**Link-Belt Co.,** 307 N. Michigan Ave. Chicago, Ill. (20 pp.) Contains series of tables, use of which will shorten time required to compute center distances and chain lengths of chain drives operating over cut-tooth wheels. Number of teeth in small sprocket wheel of drive is given in upper right-hand corner on right-hand page of each spread of pages in book. Number of teeth in large wheel appears at top of each of the tables. Body of table gives exact center distances for a chain of 1-in. pitch and of length listed in pitches in first column. Center distance for any other pitch of chain may be obtained by multiplying centers in table by pitch.

Look for the Arm-and-Hammer

ARMSTRONG BROS.



IDEAL CHAIN TONGS

For Pipe, Fittings and Flanges

The JAWS have straight teeth for pipe, and V shaped teeth for fittings. Drop-forged from special high carbon steel carefully milled, heat-treated and hardened for toughness and lasting qualities.

The HANDLES are forged from spring steel heat-treated to give the required stiffness.

The CHAINS are proof-tested.

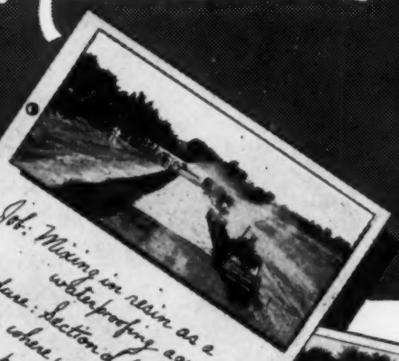
Write for catalog C-39a for complete showing and description of Armstrong Pipe Tools.

ARMSTRONG BROS. TOOL CO.
The Tool Holder People
334 N. FRANCISCO AVE CHICAGO, U.S.A.
Factory, Warehouse & Sales, 100 Lafayette St., New York

PAGES *from an* ENGINEER'S *Notebook*

ABOUT THE SEAMAN PULVI MIXER

Job: Reconstruction of highway badly "washboarded" due to excessive bitumen. Procedure: Scarified first, then pulverized in-place with SEAMAN MIXER. Next 1½ inches of sub-grade material added to mix. Sub-grade material obtained and simultaneously mixed by operating SEAMAN MIXER 1½ inches below the mat.



Job: Mixing in resin as a waterproofing agent. Procedure: Section of highway was in area where water table was close to sub-grade. SEAMAN MIXER operated after grader to pulverize soil. Resin mixed in-place with two SEAMAN MIXERS working in sequence. Compaction with sheep's foot and rubber tired roller.

Checked work of soil pulverization prior to soil-cement stabilization. Results OK'd after two passes with the SEAMAN MIXER. Pulverization better than specifications.

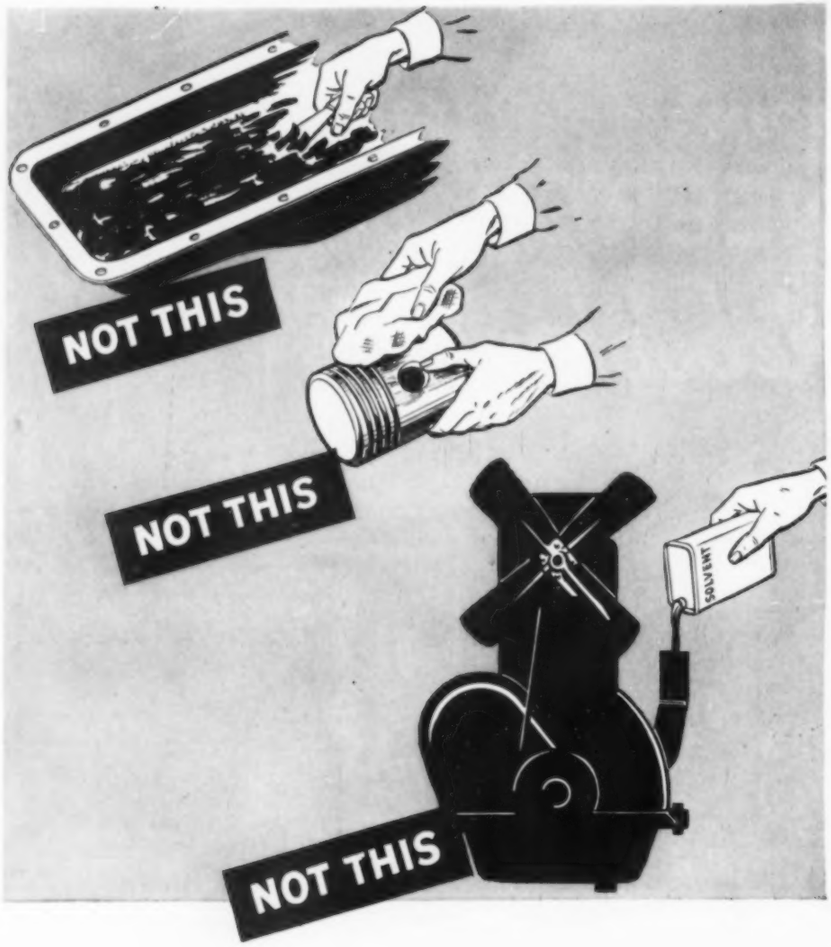
Job: Asphalt center strip between double concrete highway. Procedure: ① Trees and stumps cleared and top soil stripped on nearby area. ② Surface grade leveled on area and oil distributor fueled. ③ SEAMAN MIXER used for in-place mixing. ④ Mix aerated by SEAMAN (hood open) in preparation for removal to highway center strip where asphalt was laid in 6" lift for initial rolling. ⑤ Cycle repeated in mixing additional material.

Job: Emergency drying of gravel emulsion base course. Procedure: Sudden rain fell before compaction. Contractor put SEAMAN MIXER on job operating with hood open to aerate and dry materials. Moisture reduced 50% in the first pass. Job OK'd after second pass. Contractor figured SEAMAN MIXER saved him $10,000!

MODEL MHD-72

The NEW 1944 edition of "Soil Stabilization Methods" is off the press. Ask for Bulletin C-24.

SEAMAN MOTORS
MILWAUKEE WISCONSIN



..but here's a better way to keep engines clean . . . to reduce wear

THERE ARE many ways of keeping engines clean. You've probably tried most of them. From digging sludge and "gunk" out of the crankcase—cleaning or scrapping varnish coated pistons, valves and bearings—to adding solvents in the crankcase oil to loosen accumulation. *Now* there is an easier way. Use Stanolube H. D. It eliminates at the source the most troublesome cause of engine deposits—it is inhibited against oxidation. What this means is described at the right. You can find out what it means in longer engine life in your fleet by asking a Standard Automotive Engineer to help you make a test. Call the nearest Standard Oil Company (Indiana) office, or write 910 S. Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you. In Nebraska, write Standard Oil Company of Nebraska at Omaha 2.

Causes of engine deposits. Engine deposits are caused by two principal sources of contamination; 1. Road dust, fuel soot, and other foreign matter which blows by rings. 2. Oil oxidation.

Deposits caused by foreign matter (road dust, etc.) are comparatively easy to control by:

1. Preventing the entrance of dirt through proper maintenance of air filters and piston rings, and good fuel combustion.

2. The use of detergent-type oils which keep these potential deposit-formers in suspension until removed by draining and filtering.

Deposits caused by oil oxidation are more difficult to eliminate. Oil oxidation occurs in all engines, but it is particularly severe under heavy-duty service. It is caused by heat and agitation of oils in the presence of air. Oxidized oil forms varnish or lacquer-like deposits. These act as a binder and speed up the accumulation of dust and carbon deposits.

Detergency plus oxidation stability in Stanolube H. D. Stanolube H. D. is a detergent-type oil, but in addition, it is *inhibited against oxidation.* It prevents the formation of oxidation products because; first, it is made of a petroleum stock of good quality for lubricating oil manufacture. Then by solvent refining the unstable hydrocarbons—those easily oxidized—are removed. Finally, the remainder is stabilized by the addition of a special oxidation inhibitor and detergent developed in Standard Oil laboratories.

In Stanolube H. D., the rate of oil oxidation is slowed down to the minimum. Its detergency action becomes doubly effective in preventing the formation of deposits from foreign contaminants and the few oil oxidation products which develop. Besides preventing deposits, the mild solvency or purging action of Stanolube H. D. safely removes deposits formed prior to its use and has cleaned up many dirty engines over a period of time.

★ ★

heat-proofed
Stanolube H.D.

★ ★

Gasoline Powers the Attack . . . Don't Waste a Drop!

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ **FLEET CONSERVATION SERVICE**

TWIN-RIBBON
Concrete Spreading

• Koehring Paver stability permits practically right angle pouring. Bucket can travel to end of boom for maximum spreading area.

CUT BATCH CYCLE TIME...

Koehring Pavers, Twinbatch and Unibatch, have the special fast spreading Twin-Door boom bucket. Twin doors, both opening same direction, provide Double-Quick Dumping and Spreading. Twin ribbons of concrete are spread on the grade. Action is instantaneous . . . large Twin-door opening is approximately 13 square feet. Full width of bottom is used for door opening. No choking at bucket doors with dry or harsh concrete. Bucket shaking is not necessary. Seconds saved when dumping and spreading cut batch cycle time.

DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment *NOW*, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

KOEHRING HEAVY DUTY

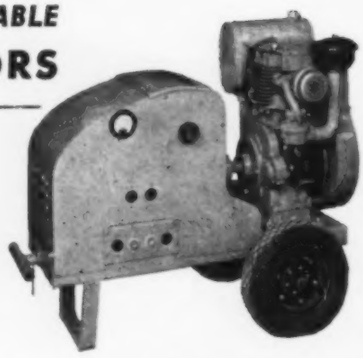
ARMY E NAVY

MEMBER MIXER BUREAU
AFFILIATED WITH A. G. C.

KOEHRING COMPANY
Milwaukee 10, Wisconsin

HEAVY-DUTY CONSTRUCTION EQUIPMENT

HERE IS ONE OF THE DEPENDABLE
GRIFFIN GENERATORS



COMPLETE SELF-CONTAINED

Thoroughly dependable Power and Light anywhere wanted

A small capacity all-purpose job, protected from weather, dust. Simple, rugged. Gives 120 volts for lighting or 240 volts for power. EASILY MAINTAINED. Rolled by 1 man. On this single cylinder engine an all steel coupling running in a bath of oil prevents customary coupling troubles. Every small job requires one—large jobs can use several economically. Eliminate poles, long wiring, delays. Hardly a job of any magnitude completed without Griffin Generators. *Call or write any of the addresses below.*

MODEL 1A 3AH
SMALL COMPACT EASY TO HANDLE AC 3-WIRE

Steel Tread Wheels during the Rubber Shortage

●

"Engineered and built to give you the same dependable Long Life as all Griffin products."

MID-WEST
GRIFFIN EQUIPMENT CO., INC.
548 Indiana Street • Hammond 1662
HAMMOND, INDIANA

SOUTH
GRIFFIN ENGINEERING CORP.
633 N. Myrtle Ave. • Jacksonville 5-4516
JACKSONVILLE, 4, FLA.

MAIN OFFICE: 881 EAST 141st STREET, NEW YORK 54, N. Y.

GRIFFIN EQUIPMENT
and Supply Corporation

WELLMAN (WILLIAMS TYPE) BUCKETS

SINCE 1931 Wellman Buckets have combined the many special mechanical features of the famous Williams Clamshell Bucket with the construction "know-how" of The Wellman Engineering Company. For 50 years Wellman has built heavy bulk material handling equipment for steel plants and other heavy industries.

Multiple Rope and Power Arm Types • Dragline • Power Wheel • Dredging • Special Service Buckets ⅛ to 16½ Yd. Capacities.

Welded Rolled Steel Construction

FOR GREATER STRENGTH LIGHTER WEIGHT LONGER LIFE

Welded construction, once confined to custom-built Wellman Buckets for steel mill and dredging service, is now featured in every Wellman-Williams Bucket.

SEND FOR FREE BULLETIN

Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

THE WELLMAN ENGINEERING COMPANY
7017 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in principal cities

HAULING EQUIPMENT OPERATOR'S HANDBOOK —**Euclid Road Machinery Co.**, Cleveland, (17) Ohio. (69 pp., illustrated) Detailed operating suggestions and instructions based on practical field experience for 15-ton rear-dump and 13-cu. yd. bottom-dump Euclid truck and tractor-trailer units. Among the topics covered are servicing the engine (a Cummins diesel), electrical system, cooling system, clutch, transmission, rear axle, air brakes and hydraulic body hoist. Practical hints are given on starting the engine, driving, and stopping engine. Special notes cover bottom-dump and rear dump operation. There is a table of recommended tire pressures and travel speeds in different gears. Lubrication charts and charts for air brake inspection and tests are a valuable feature of the manual.

★ ★ ★

WIRE ROPE CONSERVATION—**Macwhyte Co.**, Kenosha, Wis. (22 pp., illustrated) Contains series of illustrated articles on wire rope conservation designed to aid users in getting the most out of this product and thus to help save supply of steel in the United States. These articles were originally advertisements in leading trade journals. Some of the subjects covered: "Why Corrosion Shortens the Life of Wire Rope"; "How Sheave Materials Affect Wire Rope Service"; "How You Can Lengthen Wire Rope Life"; "Importance of an Adequate Safety Factor for Your Wire Rope"; "How Thorough Lubrication Lengthens Service Life of Wire Rope."

★ ★ ★

TRUCK-MIXER MAINTENANCE GUIDE — **Chain Belt Co.**, Milwaukee, Wis. (22 pp. pocket-size, illustrated.) Practical suggestions for wartime care and maintenance of Rex Moto-Mixers to insure operating efficiency and prevent breakdowns. Among subjects covered are cleaning the equipment with high-pressure water hose to prevent accumulations of hardened concrete, oiling chain drive, checking water control system and pump, adjustments of drum brake and drum rollers, care of transmission, charging hopper assembly and engine. The booklet concludes with a lubrication chart, a number of useful operating hints and a check-up list.

★ ★ ★

AIR COMPRESSORS—**Sullivan Machinery Co.**, Michigan City, Ind., (52 pp. illustrated) Describes line of heavy-duty, multi-stage air-cooled stationary compressors for heavy contracting, mines and industrial plants. Types include two-cylinder V-vertical and four-cylinder semi-radial. Available in single and twin units with piston displacement capacities ranging from 378 to 3,656 cu. ft. per min. at pressures up to 125 lb. per sq. in. Twin units have common double-shaft motor. One compressor with motor can be installed and the twin compressor added when required. Information is given on types of drive, foundation requirements, design details, regulation, accessories and servicing.

P&H

SMOOTH POWER!...Keep it Smooth!

To help you get the utmost service—to assure smooth, efficient transmission of power—to prevent bearing failures and costly replacements—P&H has prepared a new lubrication chart for the vital jackshaft assembly. It's clearly illustrated and complete with directions on how to apply the proper oil or grease for each component part. Make use of it—keep your jackshaft *properly* lubricated.

All-welded construction of rolled alloy steels, true rolling crawlers, hydraulic control and many other advantages keep P&H machines on the job with a minimum of attention.

MAKE WAR ON WEAR...
WITH PROPER CARE!

Every P&H owner and operator should have a copy of this new P&H Wartime Service Bulletin. Write today for folder D-68, "Jackshaft Lubrication."

General Offices: 4494 W. National Ave., Milwaukee 14, Wisconsin

HARNISCHFEGER
CORPORATION
EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

P&H Excavators are built in all capacities from ⅜ to 5 cubic yards; gasoline, Diesel or electric power.

Sonotube
proves out for
CONCRETE COLUMN FORMS

12 to 14 Ft. Heights

"After the successful use of the SONOCO *Tubes for column forms on our Treadwell School Project we do not hesitate to recommend them to anyone for a construction project of this type."*

General Contractor.

6 Standard Sizes

INSIDE DIAMETER					
8"	9"	10"	11¼"	12"	13½"
SQUARE INCHES					
50.26	64	78.54	100	113.1	144

Smaller sizes available.

IMMEDIATE DELIVERY

WRITE FOR DELIVERED PRICES

SONOCO PRODUCTS COMPANY

HARTSVILLE, S. C. MYSTIC, CONN.

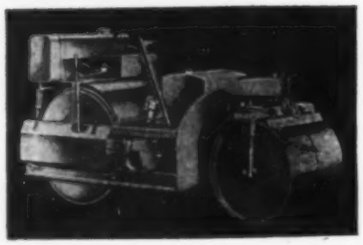
ROCKINGHAM, N. C. DARWOOD, N. J. LOWELL, MASS.

PRE-ENGINEERED SPRING HANGER—**Grinnell Co., Inc.,** Providence, R. I. (4 pp., illustrated) Describes and illustrates new hanger designed to minimize changes in pipe supporting force. Piping engineers who have struggled with the design of simple spring hangers to support modern flexibly supported piping systems may now select a stock size of hanger from a simple table after the load has been computed. Hanger is available in fourteen sizes with a load range from 84 to 4,700 lb. All-steel welded construction meets pressure piping code. Swivel coupling provides adjustment and eliminates turnbuckle. Its compact design cuts required headroom to a minimum. Installation is simplified by integral load scale and travel indicator. Bulletin gives full data on hanger, including simple capacity table.

★ ★ ★

BITUMINOUS PAVEMENT—**Kotal Co.,** 52 Vanderbilt Ave., New York 17, N. Y. (18 pp. illustrated) A five-year record shows applications to paving jobs of all-weather bonding process for combining bitumen with aggregates of all types, wet or dry, to produce tough and durable paving mixes. Jobs which have stood test of time are said to show that work can go forward in any weather, even in extreme cold or heavy rain, and that wet aggregates, wet laying surfaces or rain on the mix make no difference in the result. Stockpiled mixes are claimed to remain workable for up to 12 months, and pre-treated aggregates to be good for use in surface treatment, seal coating or mixed-in-place construction for a year or more after being processed.

C.H.&E.
3 Ton Roller

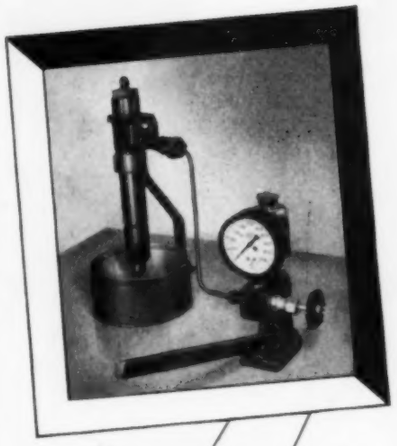


For rolling footpaths, driveways, sidewalks, tennis courts, playgrounds, and general maintenance work. The forward and reverse speed is controlled by one hand lever. Both front and rear rolls can be filled with water. Easy to load on a truck for transportation from job to job.

We also manufacture Saw Rigs — Pumps — Hoists — Bar Cutters and benders.

Write for catalog.

C. H. & E. Manufacturing Co.
3847 No. Palmer St.
Milwaukee 12, Wis.



ADECO
NOZZLE TESTER

KEEP DIESEL ENGINES RUNNING AT PEAK EFFICIENCY

With this sturdy, portable, lightweight Adeco Nozzle Tester, any mechanic can easily make quick, accurate tests on injector opening pressure, spray pattern, etc. and detect stuck needle valves and leakage around valve seats. Adeco advantages have made this America's most widely used nozzle tester. Tests both large and small injectors, on bench or engine. Avoids costly delays and possible damage to engine. Keeps diesels operating at peak efficiency.

Write for new illustrated bulletin.

ADECO

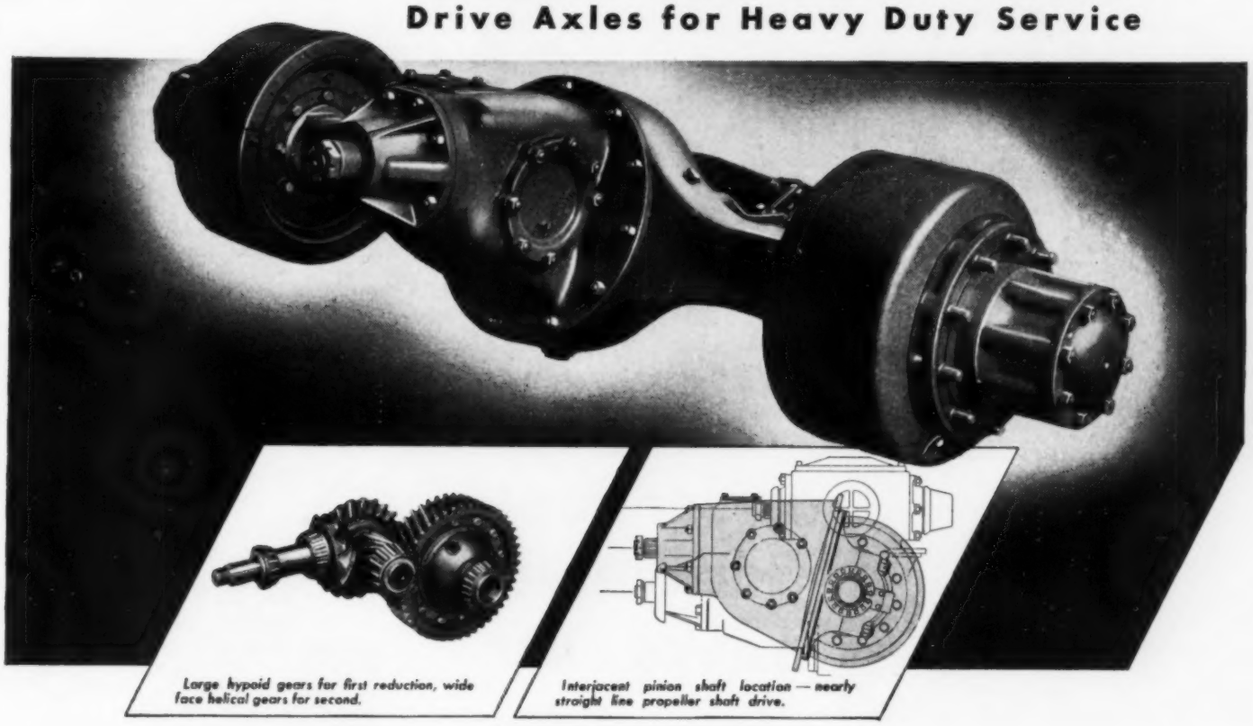
AIRCRAFT & DIESEL EQUIPMENT CORPORATION

4401 NORTH RAVENSWOOD AVENUE
CHICAGO 40, ILLINOIS

Announcing

S-200-P and U-200-P

New Series of Timken Double Reduction Drive Axles for Heavy Duty Service



Large hypoid gears for first reduction, wide face helical gears for second.

Interjacent pinion shaft location — nearly straight line propeller shaft drive.

"Well Done"

Timken-engineered throughout, these great new axles combine all the time-tested Timken features with many important new improvements. . . . S-200-P is intended for heavy duty hauling on highways and city streets where permissible loads are over 18,000 pounds per axle, at tires on ground. Torque capacity is ample for modern high-power engines. . . . U-200-P is for off-the-highway operations, using the same engine torque but where still greater load-carrying capacity is required. . . . Write for descriptive literature — ask for a Timken Axle Engineer to work with you in solving your axle and brake problems.

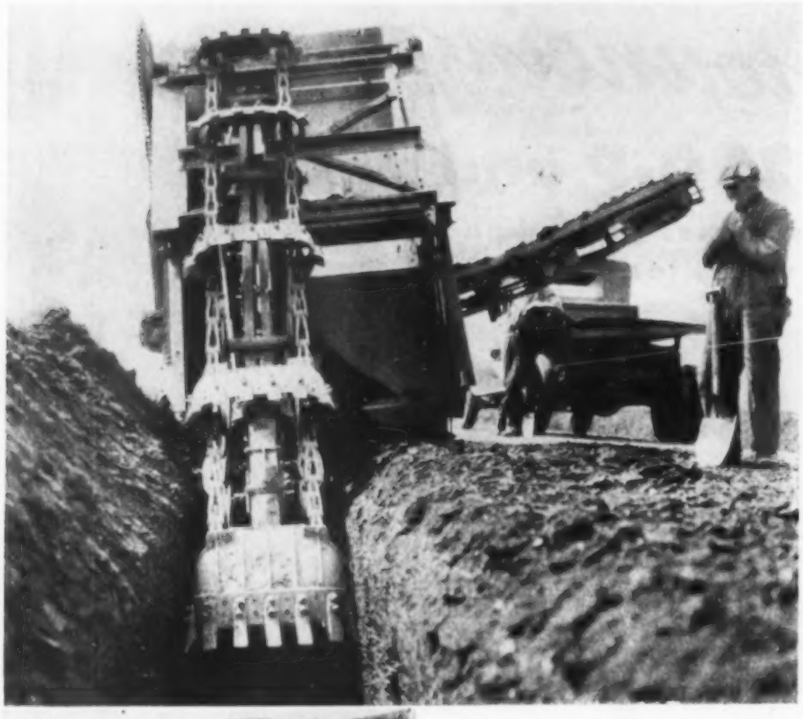
38 YEARS OF AXLE ENGINEERING LEADERSHIP

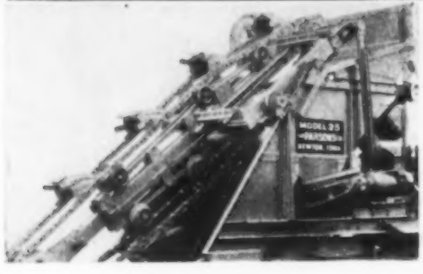
TIMKEN AXLES

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT 32, MICHIGAN

WISCONSIN AXLE DIVISION · OSHKOSH, WISCONSIN

PARSONS





OFFSET BOOM TRENCHING SAVES TIME

● Avoid costly hand excavation on difficult trenching by using a Parsons Trencher.

The offset boom, standard on Parsons Trenchers, makes it easy to dig close to steep banks, near trees or poles and next to curbing. The trench may be cut on line with the outside edge of either crawler just as efficiently as with the boom in center position.

It takes but a few minutes to shift the boom to any position across the width of chute. The shift is positive through its rack and pinion mechanism and the boom is held solidly with heavy bolts through boom and carriage frame.

This is only one of the superior Parsons features.

THE PARSONS COMPANY
NEWTON, IOWA

TRENCHING EQUIPMENT PARSONS

CONTINUOUS BAND FILING MACHINE—**Continental Machines, Inc.,** 1301 Washington Ave., South, Minneapolis (4) Minn. (4-p., illustrated) Bulletin shows how continuous band filing supersedes outmoded hand filing and reciprocal machine filing operations through proved tests indicating that continuous file broaching operations are many times faster than former methods. Illustrations show various internal as well as external file broaching jobs and the ease with which inexperienced operators can perform this work. Included in bulletin is a display of various kinds of DoALL precision file bands available for any filing operation on the new DoALL band filer.

★ ★ ★

FIRE RETARDANT—The New Jersey Zinc Co., 160 Front St., New York City (7) N. Y. (16 pp. and cover, illustrated) Booklet entitled "Properties and Uses of Zinc Borate-3167" contains a review of present practice of imparting fire resistance, with emphasis on the combination of fire resistance and resistance to mildew, weathering, water and other solubilizing agents by use of Zinc Borate 3167. This chemical has been used in the war effort in large quantities, especially in fire retardant compositions for treating textile fabrics such as camouflage nettings, osnaburg cloth, cotton duck and cotton drill. Generally, resinous like chlorinated hydro-carbons are used in conjunction with zinc borate. This product also is incorporated in electric cable sheathing to help prevent the spread of any fires on shipboard. Copies of this booklet are available upon request addressed to Development Products Division.

Shunk
Superior Quality
BLADES
AND CUTTING EDGES
For any make of machine
Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls. Also—
CUTTING EDGES
WEARING BOOTS
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCARIFIER TEETH
50 years of manufacturing blades has developed for you a special steel, milled through our own rolls and forged at the edges to give that extra wearing quality you need.
All widths, lengths, and thicknesses. Punched ready to fit your machine.
Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.
Shunk
MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO.

A pair of 34-E Multi Foote Pavers working in tandem speed up completion of airport runways in America.

Somewhere in England a pair of 34-E Multi Foote Pavers pave 210 feet of 25-ft. runway 8-in. thick every hour.

Breaking Paving Records

Is a Habit of Ours at Home and Abroad

Paving airport runways and roads at record-breaking speed is an every day job for Multi Foote Pavers. They set more records than any other make, not only because there are more of them in service but because all these features mean better mixing and faster charging and discharging:

DOUBLE CONE DRUM with its end-to-end scouring action insures a complete and thorough mix of every batch.

TROUBLE-FREE WATER SYSTEM is simple, accurate and independent of water pressure.

HIGH OPERATING PLATFORM assures greater visibility and faster, more accurate work.

ROTARY DISCHARGE takes only a quarter turn to kick concrete into the big bucket ready to speed out the long boom to be discharged.

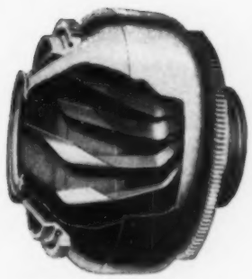
BIG, WIDE, SOLID SKIP prevents spilling and assures fast, positive charging.

SIMPLE, RUGGED DRIVE provides fast, smooth action.

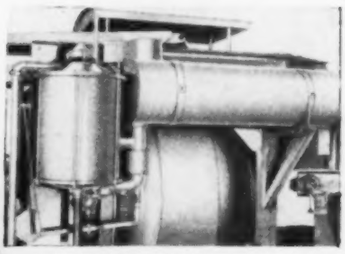
Multi Foote Pavers are leading the field all over the world. Machines that can win the battle of putting down runways and roads in war theatres everywhere are a sure thing to make money for you on peacetime road contracts. Write direct or ask your Foote dealer for all the details.

THE FOOTE COMPANY, INCORPORATED, Nunda, New York

The World's Largest Exclusive Manufacturers of Concrete and Black Top Pavers. ★ *Multi Foote Pavers Conform to A. G. C. Standards and Specifications.*



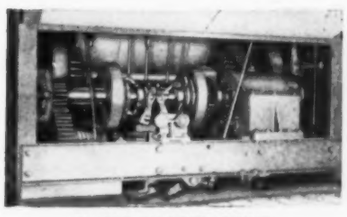
DOUBLE CONE DRUM



TROUBLE-FREE WATER SYSTEM

BIG WIDE SOLID SKIP

HIGH OPERATING PLATFORM



SIMPLE RUGGED DRIVE

ROTARY DISCHARGE

MULTI FOOTE

CONCRETE PAVERS

ARMY ⓔ NAVY

ADNUN BLACK TOP PAVER

To Make the Most of His Skill He Must Use the Right Tool

Before a carpenter makes a cut with his plane he studies the job—so he'll know *which* plane will produce best results. Is it a deep or thin cut, wide or narrow, with or against the grain? How hard is the wood? Are there knots?

Then he selects the plane that's *built* for that particular job—and *uses* it right. He holds it "just so," applies just the right amount of pressure. Result: A perfect cut.

Explosives, like planes, are also tools. Some explosives produce good breakage on many jobs, but other jobs call for a *special* explosive. And it must be used in the right way. The charge must be planted "just so"— and the right quantity. *Then* you get good blasting, save time, labor, equipment.

Atlas Representatives, with their extensive knowledge of rock formations and explosives, apply synergistic* thinking to the blasting problems of customers—and produce those "2 plus 2 equals 5" results that build blasting profits.

Synergism:** ***The force that produces "2+2=5" results when you and we get together and really "click."

The Atlas man studies all the facts, discusses the pros and cons with the blaster, combines ideas with him. Then the answer evolves: "Use *this* explosive, in *this* amount and in *this* manner—and you will get utmost in fragmentation."

Let us work synergistically with you on YOUR blasting problems. Consult Atlas.

ATLAS EXPLOSIVES *"Everything for Blasting"*

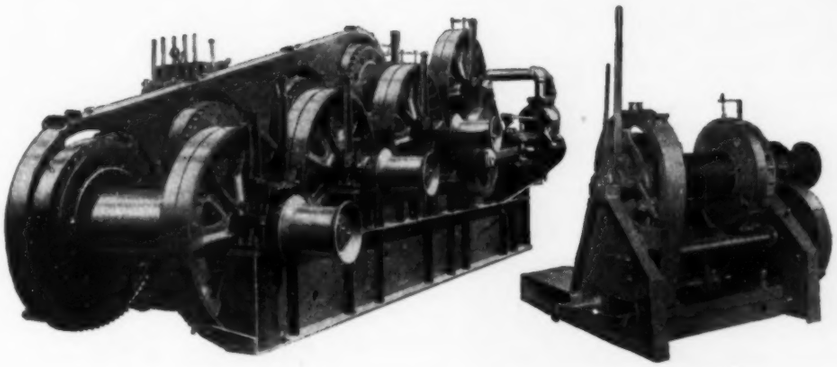
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

AMERICAN

MATERIALS HANDLING FOR EVERY INDUSTRY

An AMERICAN Hoist for every Construction Job

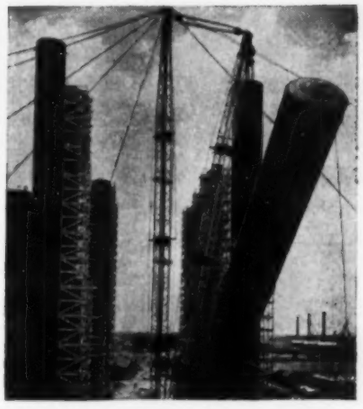


What are your requirements—a small, single-drum, one-ton hoist, or a large, powerful, multi-drum hoist for a 250-ton derrick, or even larger—steam, gasoline, electric or diesel? AMERICAN has the years and variety of experience to give you in an AMERICAN Hoist just about what you need in that method of materials handling.

There are three catalogs on Hoists. The catalogs illustrate how different sizes and types are used. Included also is a description of many features that make an AMERICAN Hoist a flexible, versatile unit.

Now is the time to find out what these hoists can do for you later.

AMERICAN Locomotive Crane in an aggregate plant.



AMERICAN Derrick erecting butadiene towers.

AMERICAN REVOLVER in dam construction.

4420

Plan now . . . but wait for **AMERICAN!**

AMERICAN MATERIALS HANDLING *for* EVERY INDUSTRY

AMERICAN HOIST & DERRICK CO.

Saint Paul 1, Minnesota

CHICAGO SAN FRANCISCO NEW YORK

Wherever wire rope is fastened . . . . use genuine **CROSBY CLIPS** *with the Red-U-Bolt*

"SERVICE-ABILITY"

Proven by Years of Performance!

"SERVICE - ABILITY" —

it's a new word. But it most exactly describes CLEVELAND TRENCHERS.

• Many "Clevelands" built 15 to 20 years ago are still on the job today doing their part to ease the manpower shortage.

Although out-moded by "Cleveland's" modern standards of performance, this evidences the soundness and correctness of the basic design pioneered by Cleveland.

It also tells the story of "Cleveland's" policy of rendering prompt repair parts service even on these old machines.

This kind of service and this kind of ability are two more reasons why "Clevelands" continue to be the profitable long range investment in the trenching machine field.

Guarantee yourself this "Service-Ability" in your Post-War trenching jobs by using Clevelands.

THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVE "Pioneer of the Small Trencher" CLEVELAND 17, OHIO

"CLEVELANDS" Save More...Because they Do More

Tractor Cranes—Pneumatic or Solid Tires. Trailer Trucks, All Types, All Sizes. Fork Lift Trucks. Elevators, Platform and Stacking. Conveyors. Hoists. Engineered and built to requirements.

Materials HANDLING *Equipment*

MERCER-ROBINSON COMPANY, INC.

30 CHURCH ST., NEW YORK 7, N.Y.

Equipment for processing, liquid and dry materials, foods, chemicals, reclaimants. Individual mixers, sifters, separators, crushers, cutters, mills. Combination units. Complete systems. Standard and engineered installations.

Materials PROCESSING *Equipment*

SOIL STABILIZER—**Hercules Powder Co.** Wilmington, Del. (8 pp., illustrated). Booklet describes stabilization of soil by addition of small percentage of new resin compound called Stabinol, in powder form, mixed dry into soil having moisture content near optimum. Resin powder waterproofs soil, preventing water absorption or capillary action, and thus preserves stability of compacted earth containing proper proportion of natural binder.

★ ★ ★

WIRE ROPE SLINGS—**John A. Roebling's Son Co.** 640 South Broad St., Trenton (2), N. J. (72 pp., illustrated.) Presents data on wire rope and grommet slings for both standard and special uses, in addition to the Roebling "Flatweave" sling. Gives recommended safe loads and size ranges and is profusely illustrated with application pictures of slings in actual use or hoisting duties of all sorts. One section is devoted to the various types of wire rope fittings for use in connection with slings, including open and closed sockets, clips, clamps, thimbles, eye hooks, shank hooks, shackles, turnbuckles and swaged fittings.

★ ★ ★

Prestressed Concrete Pipe

(*Continued from page* 66)

tion throughout the full length. The cylinder is rotated at 100 rpm. while filling and centrifugal force spreads the concrete evenly. In 7 min., the pipe is brought up to a rim speed of 2,600 fpm., comparable to about 294 rpm., and revolved at that speed for 10 min. Centrifugal action removes excess water, which is blown out by a compressed air jet, and makes the concrete immediately hard enough so that the cylinder can be picked up and stood on its end. The pipe design is such that the concrete will always be in compression under operating conditions.

Mortar Coating Process

Wire is wound spirally on the pipe and then a mortar coating is applied for permanent protection. The mortar is prepared in a small mixer and fed by a screw device set to supply a measured amount of material to coat the pipe ¾ in thick. The freshly coated pipe is wrapped with a loosely woven cotton webbing to minimize any tendency for the mortar to be displaced before taking its initial set.

The pipe on the Washington jobs was designed for hydraulic heads varying

(*Continued on page* 120)

NEW *Thor* RETAINER

...provides NEW OPERATING SPEED

Fully-enclosed to prevent clogging . . . to function smoothly for the life of the tool, the springs in this new Thor Retainer now give you longer, steady "cushioned" action on operations typical of the above — where the shock of removing the drill from a hole is absorbed.

WITH *Thor* ROCK DRILLS

Thor design scores again with an *exclusive* development to bring you *new operating speed* with Thor Rock Drills.

It is the new Thor "Spring Cushion" Steel Retainer which now *fully encloses* its springs to bring you these new *speed* advantages:

✔ Fully enclosed Thor springs *last longer . . . save you time and maintenance cost,* because they are protected from dirt and other particles to prevent clogging.

✔ Fully enclosed Thor springs *retain longer, steady "cushioning" action* because they are sealed at proper tension inside a steel cap that is part of an inherent retainer design preventing them from being overtightened by the operator or repairman.

✔ Fully enclosed Thor springs *help you work faster . . . longer* because this same principle of *steady tension* makes the spring-attached locking device easier to operate in removing the drill shank from the tool under operation.

For full information about these new, improved Thor Sinker Rock Drills write today for Catalog 42A.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO, ILL.

Branches in Principal Cities

To clear the way for the mass movement of troops, weapons and supplies to the far corners of the world, Insley Excavators are working the clock around on every front . . . preparing landing strips and port facilities . . . building roads . . . doing many other jobs essential to victory.

So numerous are these jobs, in fact, that all of Insley's expanded production facilities are required to meet the need. That means, of course, that home front demands must take a back seat for the present. But it also means that the contractor who plans his postwar jobs around Insley Excavators will be sitting in the driver's seat because, out of our present experience, will come Insley Excavators that will move dirt cheaper, faster and more efficiently than ever before.

EXCAVATORS • CRANES • BUCKETS • CARTS
INSLEY
CONCRETE PLACING EQUIPMENT
INSLEY MANUFACTURING CORPORATION
INDIANAPOLIS 1, INDIANA

(*Continued from page* 118)

from 384 to 480 ft. William R. Brend was engineer and superintendent for the Lock Joint Pipe Co. operations and N. S. Myers was concrete foreman. Two of the installations were made for the Water Department of the District of Columbia, J. B. Bordon, chief sanitary engineer, and the other for the Washington Suburban Sanitary District, Harry R. Hall, chief engineer.

★ ★ ★

Florida Overseas Highway

(*Continued from page* 59)

and steel bridge structures and rights-of-way of the Florida East Coast Railway which was destroyed by hurricane in 1935. There are 39 bridges to cross on the way from the mainland to Key West.

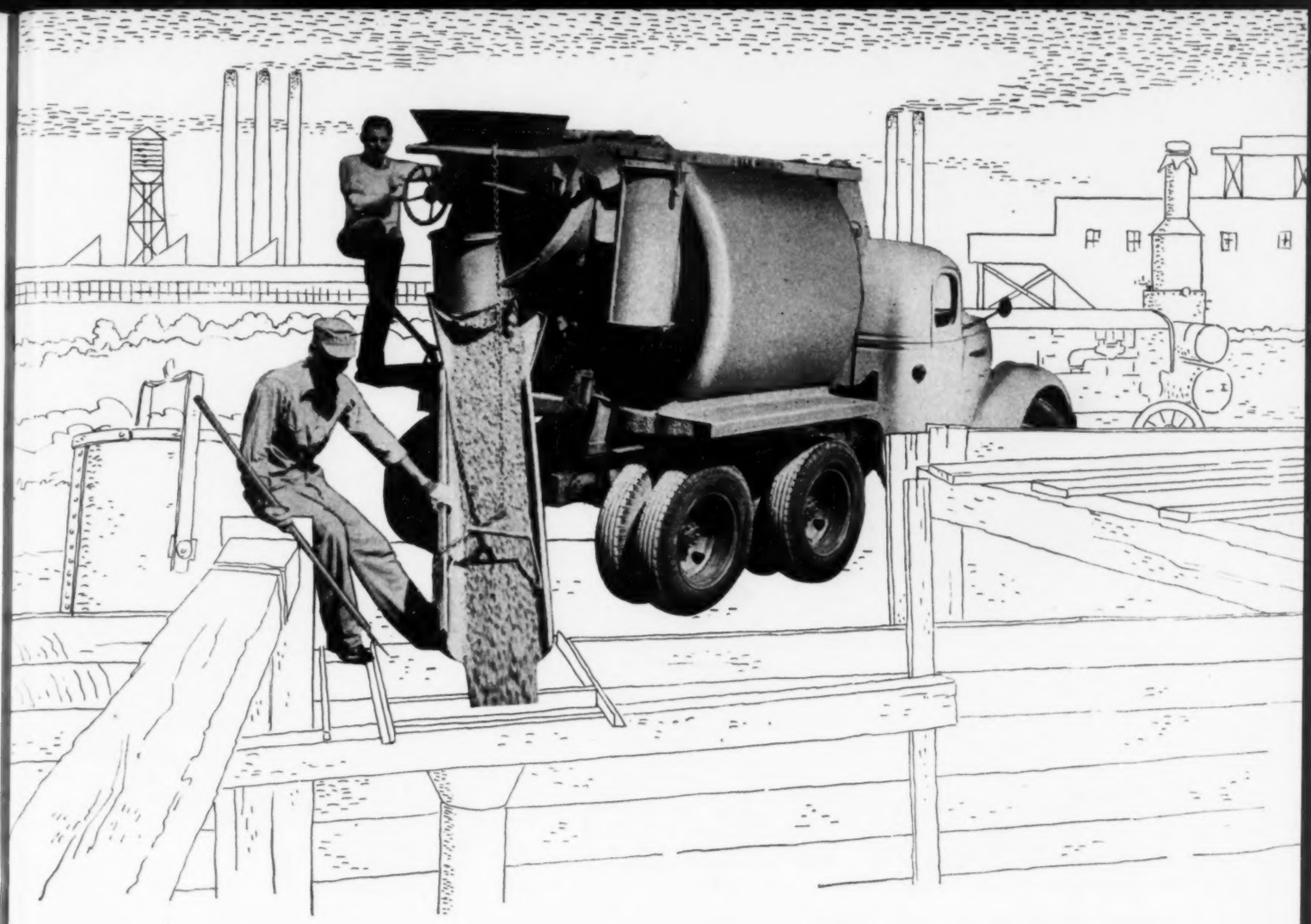
Plans and specifications for reconstruction were advertised late in 1942 but the bids proved to be too high and all were rejected. It was decided that the state road department would do the work and construction was started on approximately 20 mi. of new highway in Dade and Monroe Counties between Florida City and Key Largo and five bridges between Florida City and Lower Matecumbe Key. The present program calls for conversion to highway use of 19 old railroad bridges and four new bridges. E. C. DeGarmo is resident engineer in charge of the state's day labor work.

To hurry completion it was decided to advertise again for bids on two additional sections in March, 1943. Both contracts were awarded to Groves, Lundin & Cox, who submitted low bids of $1,062,194.82 for the construction of 30.315 mi. between Key Largo and Lower Matecumbe Key and $329,471.28 for building 11.686 mi. between Grassy Key and Key Vaca.

Highway Clearance Operations

The Key Largo-Lower Matecumbe Key section called for a highway with an 8-in. lime-rock base, 22 ft. wide at the top, with 7-ft. shoulders and extensions on a 1 on 4 slope on each side, to be built over the old line of the railway. A heavy overgrowth of brush and small trees had grown up through and over the railway bed. Workmen with axes, rakes, bulldozers, power shovels, and draglines cleared

(*Continued on page* 122)



It's "Cushioned" to cut maintenance costs!

YOU can forget about the dangers of road shocks—of weaving and sidesway—the strains of quick starts and stops with a fully loaded drum—*if* your truck mixer is a Rex.

For the drum of a Rex Moto-Mixer rides on a cushion . . . the exclusive chain belt drive that absorbs all shocks and stresses. There are no unyielding gears and pinions to transmit damaging shocks directly to the costly transmission and power plant.

Many Moto-Mixer owners say this one feature alone is enough to make Rex their choice . . . that their maintenance costs are practically limited to greasing and cleaning.

And there are other advantages you get with Rex and Rex only. You get 100% accurate water system; 5-in-1 Quint Spout; the exclusive Rex Hi-Lo Mixing action; the Rex end-charging hopper; revolutionary visible mixing; Rex unrestricted discharge; and many others.

• • •

FOR INFORMATION on Rex Moto-Mixers, send for your copy of Bulletin No. 405. And check the other Rex construction equipment: Mixers, to cut concrete placing costs; Pavers, that can give you really heavy yardage production, faster; Pumpcretes, that pump concrete by pipeline . . . Pumps, that move water economically and efficiently. See your Rex Distributor, or write direct to Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin.

CHAIN BELT COMPANY *of Milwaukee*

REX

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

RAPID DUMPING FOR HI-SPEED

In digging and material handling, too, rapid discharge of the load is an essential feature. Every Owen Bucket is designed to incorporate rapid discharge operation — a factor responsible for their outstanding performance.

THE OWEN BUCKET CO.

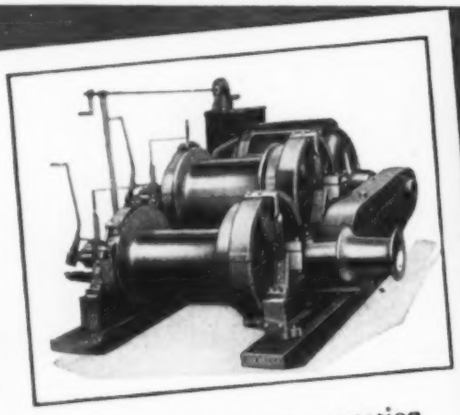
6020 BREAKWATER AVENUE CLEVELAND, O.

BRANCHES: New York, Philadelphia, Chicago, Berkeley, Cal.

OWEN BUCKETS

A MOUTHFUL AT EVERY BITE

Hoists to Fit the Job



Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency *on the job*. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire *first* of LIDGERWOOD.

ARMY E NAVY

HOISTS FOR:
CABLEWAYS
INDUSTRIAL PLANTS
CONTRACTORS
MINES—DOCKS
RAILWAYS

LIDGERWOOD

ESTABLISHED 1873

Manufacturing Company

MAIN OFFICE AND WORKS · ELIZABETH, NEW JERSEY

(*Continued from page* 120)

and grubbed 190.7 acres along the line. The railway grade was uneven and had to be grubbed and hoed to required grade. Coral rock and conglomerate were found in the subgrade and more than 43,060 cu. yd. had to be drilled and blasted from the old railroad bed. The width of the cleared area varied, depending on the height of fill to be placed on the highway which ranged from 1½ ft. to 20 ft. This called for a production of 850,000 cu. yd. of well-broken coral rock to be placed on the new road in 6-in. layers.

Laying the Surface

After the rock was placed it was processed with tractors, auto patrols, and 10-ton rollers. The final top 8 in. was placed in three to four layers, watered and rolled with 10-ton rollers to insure maximum compression and even laying of the surface. After the fill was equalized and correct grade obtained, it was rolled, wet with water and gone over with a scarifier to a depth of 4 in. It was then rolled again, wet with water, rolled some more, and allowed to stand for 7 days to become waterbound. After this the surface was treated with oil and a layer of ¾-in. commercial crushed stone was spread on in the ratio of 4.4 cu. yd. of stone to each 100 ft. of road surface. The top was then broomed by hand, rolled and surfaced with an application of hot asphalt. Asphalt was delivered to the job in tank trucks from Miami 100 mi. away. On arrival it was unloaded into 12,000-gal.-capacity tanks and heated to a temperature of 340 deg. F. Later it was pumped into distributors which were heated to maintain a temperature between 325 and 340 deg. F.

Quarrying Rock for Fill

The rock for the fill was quarried in eight borrow pits located about 5 mi. apart, just off the highway. Each produced from 65,000 to 150,000 cu. yd. of coral rock blasted with the aid of Hercules 60 percent nitroglycerin dynamite. To concentrate equipment and reduce truck haul, two pits were operated at one time. When a pit was ready to be quarried a battery of nine wagon drills, served by four portable air compressors, started putting down holes averaging 12 ft. deep, 2¼ in. in dia. and spaced 3½ to 5 ft. apart. The compressors pumped air through hose into two large receiving tanks. From here it was carried through pipes to the drilling area and finally delivered to the wagon drills through hose.

The quarries were excavated to a depth of 20 to 25 ft. Drilling and blasting were completed before the excavating and hauling equipment was brought to the

(*Continued on page* 124)

Old Friend of the Outfit

Pulling a jeep out of a submerged shell hole while under enemy fire takes plenty of you-know-what. True, it's only one of hundreds of jobs an invasion force may be called upon to do. And, it's just one of scores of ways in which good, dependable wire rope comes in mighty handy.

On the far-flung battlefronts—and at home, too—men of action know that even under the most adverse conditions they can count on the performance of Wickwire Rope.

Right now we are making more rope than ever before—but it has more jobs to do in more places. It's smart to take good care of the rope you now have so it will last longer and so our fighting forces can have more for *their* work.

Proper selection, application and usage of wire rope will make it pay dividends in longer life and higher production. Write for a copy of our free book "Know Your Ropes." And, if you have a wire rope question, we'll be happy to be of service. Write Wickwire Spencer Steel Company, 500 Fifth Ave., New York 18, N.Y.

HOW TO CONSERVE WIRE ROPE

Thousands of wire rope users—old hands and new—have found "Know Your Ropes" of inestimable value in lengthening life of wire rope. Contains 78 "right and wrong" illustrations, 40 wire rope life savers, 20 diagrams, tables, graphs and charts.

SEND FOR YOUR FREE COPY

Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene • Buffalo • Chattanooga • Chicago • Detroit • Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worcester

(*Continued from page* 122)

pits. The draglines were then moved into the quarries and operated on a working schedule of two 10-hr. shifts each day to excavate the blasted rock and dump it on to stockpiles. Power shovels dug into the stockpiles and loaded the rock into trucks for delivery to various fills.

Equipment Used on Project

The principal equipment used on the project consisted of two Gardner-Denver 365, two Worthington 315, two Schramm 315 and two Davey 315 compressors; 13 Ingersoll - Rand, Gardner - Denver and Cleveland wagon drills; four air receiving tanks; three Northwest, one Lima and one Link-Belt Speeder draglines; 50 auto trucks with body capacities from 3 to 7½ cu. yd.

Grassy Key—Key Vaca Section

Similar methods and equipment were used on the section between Grassy Key and Key Vaca. About 83,000 cu. yd. of rock was blasted and excavated for the subgrade and approximately 175,000 cu. yd. of coral rock was quarried for the fill. In clearing the rights-of-way over the abandoned railway all the old ties were found in or close to their original position and more than 29,000 had to be removed. The final section of the highway to be improved will start at Big Pine Key and extend for 26.345 mi. to Key West. This includes construction of three bridges, 9,827, 5,970 and 5,911 ft. long.

★ ★ ★

Wartime Highway Maintenance

(*Continued from page* 73)

time highway maintenance problems since the bituminous materials with which we make these repairs are classified as critical wartime materials and, therefore, difficult to obtain. As long as tar and asphalt may be obtained it is our job to patch the small holes before they become large and seal the cracks wherever possible before the roadbed becomes so saturated with water that the whole surface is likely to fail, thus necessitating reconstruction or reverting to the dragged or bladed surface. It has been recognized as good maintenance practice to seal, each year, a certain percentage of

(*Continued on page* 126)

A Griffin Wellpoint Job

GRIFFIN
WELLPOINT

Predrainage Guarantees Progress

A properly equipped and designed WELLPOINT system is of sufficient size to predrain not only the working length of the excavated trench but sufficient equipment ahead of the job to guarantee continuous daily progress. We do not fit the job to our equipment—the equipment is designed and tailored to fit the job.

For Sale and for Rent

CALL OR WRITE ANY OF THESE ADDRESSES

MID-WEST
GRIFFIN EQUIPMENT CO., INC.
548 Indiana Street · Hammond 1662
HAMMOND, INDIANA

SOUTH
GRIFFIN ENGINEERING CORP.
633 N. Myrtle Ave. · Jacksonville 5-4516
JACKSONVILLE, 4, FLA.

MAIN OFFICE: 881 EAST 141st STREET, NEW YORK 54, N. Y.
GRIFFIN WELLPOINT CORPORATION

Are you giving any thought to the cranes, shovels and draglines you will be needing for the big jobs being planned for the future.

It is none too soon to start taking stock of your excavator and material handling requirements. Only those with modern and efficient equipment can compete for the tremendous amount of work that must be done after Victory.

There is a LIMA designed and built for the job to be done, whether it be highway construction, metal and coal mining, sand, gravel and quarry work, levee work or any other kind of material handling projects.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division - - LIMA, OHIO

NEW YORK, N.Y. PHILADELPHIA, PA. NEWARK, N.J. MEMPHIS, TENN. ST. LOUIS, MO.
DALLAS, TEXAS PORTLAND, ORE. MINNEAPOLIS, MINN.
SEATTLE, WASH. SAN FRANCISCO, CALIF LOS ANGELES, CALIF SPOKANE, WASH.
MONTREAL, Quebec, Can. VANCOUVER, B. C.

LIMA

SHOVELS, ¾ YD. TO 3½ YD. CRANES, 13 TONS TO 65 TONS
DRAGLINES, VARIABLE

JOHNSON'S BULK CEMENT PLANTS
To Meet Every Need of the
PAVING CONTRACTOR

CEMENT BATCHERS

Manual automatic and semi-automatic weighing types. All-welded hoppers designed to assure free flow of materials and prevent arching of cement. Discharge valve provides positive, leakproof operation. Overhead adapter scale frame protects operating part of the scale from dirt and accident . . . contributes to convenient operation.

ELEVATING CHARGER

Combines advantages of adaptability, portability and Can be towed behind a batch truck. Crew of two or three men can block it into position and have it weighing 34 E paver batches at the rate of 90 per hour in 1½ hours . . . without a crane. Quickly converted to a transfer plant or for charging truck mixers.

DUTCH MILL

Designed for economical handling of bulk cement on paving jobs. All cement handled mechanically by one man. Equipped to unload cement from either hopper or box cars. Erection and dismantling are quick and easy. 50, 100 and 150 barrels capacity.

PORTABLE SECTION BINS

For contractors who need greater storage capacity than is provided by Elevating Charger or Dutch Mill. Completely portable. Capacity may be increased in the field. Equipped for unloading and batching cement delivered in any type of transportation facilities. 240 bbl., 375 bbl. and 500 bbl. capacities. Elevator Equipment with capacities up to 300 bbls. per hour.

The C. S. Johnson Company
Champaign, Illinois

(*Continued from page* 124)

our light constructed bituminous roads, these roads usually being in advanced stages of failure. Experience has taught us that, by so doing, additional years of service may be added. If bituminous materials continue to be critical, and we may not expect it to be otherwise, we shall be forced to scarify the oil surface and revert to the gravel surface on a large mileage of our roads in order to maintain a satisfactory riding quality. The majority of the mileage falling under this classification is of inadequate design, both as to grade and alignment, and should be placed on our post-war program for reconstruction.

Hard-Surfaced Roads

The hard-surfaced roads—those of concrete and concrete bases with high type bituminous tops—also require constant attention. Action of the elements is just as persistent on this type and, once they gain the upperhand, is even more deadly. We have concluded that it is of great importance in the maintenance of a concrete road that water be kept from under the slab in order that a firm and un-

(*Continued on page* 128)

FASTER PAINT STRIPPING

Want an EASIER and quicker way to prepare your equipment surfaces for repainting? Here's how: Use recommended Oakite material applied by Oakite Steam Gun, Model No. 384. This combination makes short work of removing old paint, caked-on oil, grease and muck . . . leaves surfaces ready for new paint coat. Moreover, it eliminates laborious hand scraping . . . puts this work on an efficient, LOW-COST basis. Details FREE, Write TODAY!

24G OAKITE PRODUCTS, INC.
Thames Street, New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**

Try them on your toughest problems!

For years the Hool and Kinne Library has been providing structural engineers with the facts they need *on every problem concerned with the design and construction of civil engineering structures.* This is a library that must be USED to be fully appreciated—that is why we want YOU to use it. We want you to forget the financial side of this proposition until you have solved some knotty problem that you may be up against—to find out how a specialist in that particular field would handle it. We want to prove to you that this library furnishes you with what amounts to the consulting services of 54 recognized structural engineering specialists.

HOOL AND KINNE'S

STRUCTURAL ENGINEERS'
Handbook Library

With many newly revised sections containing up-to-the-minute STANDARDS and PRACTICE

THESE six books offer you the most complete compilation of structural engineering data ever published; they furnish you with genuinely professional information drawn from records of actual practice and written by a large staff of specialists.

They cover the how and why of foundation and substructure design and construction, the general theory of structural members, the detailed design of such members and the design of their connection with other members—they explain the principles of statics, reactions, moments and shears in beams and trusses, influence lines, methods of computing stresses in lateral trusses and portal bracing—they give details of design and construction of steel, timber, and concrete structures of all types.

Examine the Library for 10 days in your home or office

6 volumes, 3575 pages, fully illustrated.

McGraw-Hill Book Co., 330 W. 42 St., N. Y. 18
You may send me **Hool and Kinne's Structural Engineers' Library** for my inspection. If the books prove satisfactory, I will send $3.50 in 10 days and $3.00 per month until I have paid the price of the books, $27.50. If the books are not what I want, I agree to return them postpaid within 10 days of receipt.

Signature .....
Home Address .....
City and State .....
Name of Company .....
Occupation .....
(To insure prompt shipment write plainly and fill in all lines.) C.M. 6-44

SAFER!
...POSITIVE UNBREAKABLE CONNECTION
TO CONNECT, place ends together, push and twist — they're locked.
TO DISCONNECT, simply pull back sleeves . . .
jaws open automatically.

Thor "PERFECT" AIR HOSE COUPLINGS

Positively locked connection that won't break or come apart.
Greater safety — couplings cannot separate even if one lock becomes caught on something.
Truly universal—no right or left, male or female hose ends. Interchangeable in all sizes to ¾".
Longer life — they're made of alloy steel, heat treated for extra durability; specially processed to prevent rusting.
Quicker operation—disconnect by a simple pull on sleeves; connect by a straight push and slight twist.

EXCLUSIVE DESIGN ASSURES POSITIVE-LOCK CONNECTION

Job-proved tests every day in scores of shops are demonstrating the *greater safety* of Thor "Perfect" Air Hose Couplings.

The ingenious, simple design of Thor Air Hose Couplings provides a positive, unbreakable connection . . . yet one that can be locked and unlocked quickly.

Thor "Perfect" Air Hose Couplings, stocked and sold by leading mill, marine and foundry supply distributors everywhere, can help you do countless air tool jobs *faster . . . safer!* Fill out the coupon below and ask for a demonstration *today*.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

INDEPENDENT PNEUMATIC TOOL CO.
600 West Jackson Blvd., Chicago 6, Ill.

Gentlemen:
Please arrange to have your representative call for a demonstration of Thor "Perfect" Air Hose Couplings.

NAME.....

COMPANY.....

ADDRESS.....

CITY..... STATE.....

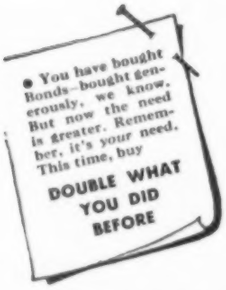
"greatest little 'cold-stoppers' in the world... DIXIE CUPS"

Of course Dixie Cups won't stop colds once started. But they can help prevent their being passed along to others.

That fact becomes doubly important on contract work where help shortage may prove serious. Use of Dixie or Vortex Cups helps prevent the spread of contagious illnesses that cause sick absenteeism.

Valuable time is saved by bringing water to the worker with the Dixie Portable Water Carrier, instead of having him leave his job to get a drink. Lost minutes quickly multiply into lost hours where no systematic watering plan is adopted.

Workers—particularly American workers—appreciate the cleanliness of individual paper drinking cups... and the thoughtfulness of a management which provides it. ★


• You have bought Bonds—bought generously, we know. But now the need is greater. Remember, it's your need. This time, buy
DOUBLE WHAT YOU DID BEFORE

Dixie and Vortex Cups are made at Easton, Pa., Chicago, Ill., Darlington, S. C., Toronto, Canada.

DIXIE CUPS

DRINKING CUPS AND FOOD CONTAINERS

(Continued from page 126)

yielding subgrade may be maintained. This is important, probably more important under the rigid than under the flexible pavement, because of the nature of the damage to the pavement when considering the investment involved. The ditches through cuts must be kept low to prevent the saturation of the adjacent subgrade. It is important that all expansion and contraction joints be kept sealed watertight, and we consider it very important that surface water not be allowed to accumulate along the edges to soak in under the pavement. Great care should be maintained in keeping the bituminous expansion joints trimmed flush with the pavement, thus eliminating the impact of the heavy loaded wheel bumping over these joints.

The maintenance of our bridges is also of vast importance, especially those constructed of the critical materials of steel and treated timber. Care should be taken that the steel bridges do not fall into the neglected class to the extent that their future years of usefulness will be impaired. Particular attention to the fire hazard should be given to all timber structures, now that timber is almost as critical as steel.

Deferable Maintenance Items

One may ask then where is there a place in highway maintenance where savings may be effected? Truly they are hard to find. There are a few of the service features that might be considered when looking for a place to effect savings. The center-line stripe, with the corresponding double and triple line traffic markers, which were designed principally for traffic control and as safety measures, could, in a time of emergency, be dispensed with in whole or in part. The lowering of traffic speed has materially decreased these previous hazards.

The maintenance of the right-of-way, outside of the ditch line, in a neat and pleasing appearance, is very desirable, but in times of war when sacrifices are being made on every hand some savings may be effected in the maintaining of the appearance of our rights-of-way.

The erection of guard posts, maintaining of guard rails, and striping of bridge ends all add to the appearance and safety of the highway, but in times of the need for maintenance economy some savings might be effected here.

The general practice of improving the shoulders of our highways by the addition of stone has usually been carried on as a maintenance item in Tennessee. This work, when done in the past, has added greatly to the safety and utility of the highway and decreased future maintenance cost, yet, in the case of dire necessity, this work could be postponed until after the war.

Nitro Starch Base

High Explosive Efficiency

IN MINING · QUARRYING · LOGGING AND CONSTRUCTION

Plus THREE ADVANTAGES FOR YOU!

WILL NOT PRODUCE HEADACHES from handling . . . reduces discomfort from breathing muck pile fumes. Better working conditions for you and your men!

WILL NOT FREEZE or leak at Arctic or Tropic temperatures. Maintained high efficiency . . . anywhere . . . anytime!

WITHSTANDS IMPACT in high-powered Rifle Bullet Test. Greater safety for workers!

Up at the front where the battle-job is toughest, you'll find Trojan Products helping our fighters speed the advance. Today a tool of destruction, Trojan Products were designed for peace—for building and development. Earnestly, we hope the power of Trojan can be turned to its intended use—as a tool of construction—soon!

EXPLOSIVES 1905 TROJAN 1944 CHEMICALS

POWDER COMPANY

ONE OF AMERICA'S OLDEST HIGH EXPLOSIVES MANUFACTURERS

PLANTS: SEIPLE, PA. • ROBERT, CAL. • MAGAZINES STRATEGICALLY LOCATED THROUGHOUT THE NATION

OFFICES: ALLENTOWN, PA. • SAN FRANCISCO, CAL. • LOS ANGELES, CAL. • PORTLAND, ORE. • NEW YORK, N.Y.

LUFKIN "MIKES"
. . always dependable

DEPENDABLE
HIGH QUALITY
TOOLS

Because "quality first" has always been the rule with Lufkin, there is today no let-up in our efforts to supply you only the best Precision Tools that skill and experience can build. You can depend on that—and you can depend on the readings you take from your Lufkin "Mike." What's more, you can get those readings quickly and easily. For complete details see your dealer and write us for Catalog No. 7.

LUFKIN
SAGINAW, MICHIGAN · New York City
TAPES · RULES · PRECISION TOOLS

Aircraft Plant Construction

(Continued from page 64)

is very fine, most of it passing an 80-mesh sieve. Superimposed loading of the hydraulic fill compressed the layer of humus, which contained more than 700 percent water in relation to weight of solid matter, and produced some consolidation of the soft material immediately under the humus.

More than a year before construction of the present plant began on Jan. 18, 1943, a large portion of the site had been cleared and more than 4,000,000 cu. yd. of hydraulic fill had been pumped in for an earlier project of the U. S. Maritime Commission, which had contemplated putting a shipyard at this location. The advance work aided a prompt start on construction of the aircraft plant. Some piles had been driven for the shipyard, and some of these piles were in positions where they could be utilized to support structures of the present plant.

Scheduled progress for the job called for completion within seven months after the start of construction, of the huge manufacturing building, an engineering building, an office building, a veneer mill, a dry kiln, a garage, a lumber storage building, an acetylene building and a flight hangar. In the same period the contractors had to complete railroad spurs more than 3 mi. in length and permanent roads requiring 100,000 cu. yd. of shell. Other structures, such as a boiler house to serve the dry kiln and manufacturing building, and a boiler house and saw mill for the veneer mill, were scheduled by the master progress sheet for early completion, to permit full operation of the entire plant.

Construction Quantities

A summary of construction quantities going into buildings gives some conception of the amount of work accomplished to get the plant ready in seven months for occupancy by the plane manufacturer. The buildings required 8,000 piles of a total length of 400,000 lin. ft., 12,300 tons of structural steel, 1,700 tons of reinforcing steel, 93,000 cu.yd. of concrete, 4,000,000 brick, 2,800,000 b.ft. of lumber, 1,760,000 sq.ft. of precast concrete roof tile, 1,600,000 sq.ft. of roof insulation, 110,400 sq.ft. of wood sash, and 186,000 sq.ft. of asbestos-cement

(Continued on page 132)

NATIONAL GUNITE
Pressure - Packed
CONCRETE

has superior advantages:

Low water ratio assures density at all points—no voids, no bubbles or air pockets. . . . Waterproof —perfect steel protection. . . . Greater strength with less thickness . . . No waste of material. . . . Great savings in time.

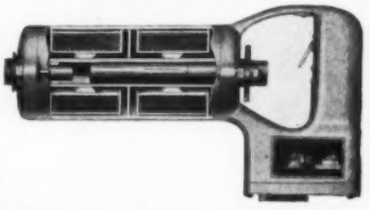
Recommended for rebuilding or relining disintegrated concrete and steel as well as new work.

National Gunite is a coast-to-coast engineering organization with years of experience, supplemented by field crews of skilled Gunite operators.

Write, giving your requirements

NATIONAL GUNITE CORPORATION
420 Lexington Ave., New York 17, N. Y.
Boston—Washington

SAVE MONEY $ $
SAVE TIME!
with
SYNTRON
DEPENDABLE
ELECTRIC HAMMERS



3600 powerful blows per minute from the ONE MOVING PART—"THE PISTON"—make short work of these "nuisance-value" jobs—

DRILLING CONCRETE
POINTING MASONRY
VIBRATING FORMS
SCALING METAL
CUTTING & CHIPPING

Four "Heavy-Duty" Models

Write us today
SYNTRON CO.
500 Lexington Homer City, Pa.

MOTOR GRADERS

ROAD ROLLERS

SPREADERS

BY . .

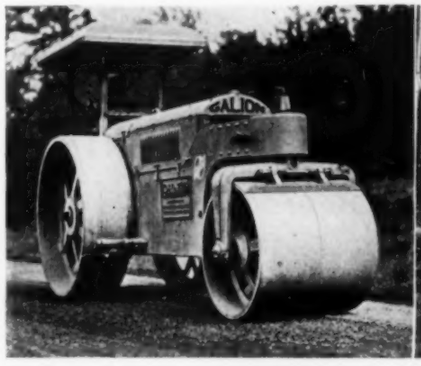
GALION

The Galion Iron Works & Mfg. Co.

Main Office and Works: Galion, Ohio

Galion continues to serve the armed forces with essential equipment for the Air Force, Coast Guard, Engineers, Marines, Navy and the Seabees. Galion continues to help bring the war ONE DAY NEARER VICTORY.

GALION ROAD MACHINERY
points to better roads



EXPERIENCE *builds 'em*
PERFORMANCE *sells 'em*

ON ROGERS TRAILERS

SAFE from invasion is no idle boast today The enemy has been driven from the Alaskan outposts and they dare not attack us here!

ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be better-engineered and more efficient than the thousands which have been operated so successfully for many years.

ROGERS BROS. CORPORATION
Albion, Penna.

MODEL 23 ILLUSTRATED
IMMEDIATE DELIVERY ON ALL MODELS

10 REASONS WHY MASTER VIBRATORS PLACE CONCRETE FASTER..BETTER ON ANY JOB!

Master Gas or Electric High Speed Concrete Vibrators are built for high frequency vibration and maintain constant speed under full load to make possible: (1) low cost, high strength concrete; (2) better bond to steel or successive layers; (3) greater density and uniformity; (4) reduced shrinkage and cracking; (5) minimum absorption, greater water tightness; (6) improved compression and flexural strength; (7) drier and leaner mixtures; (8) earlier removal of forms; (9) placing in difficult positions and elimination of hand tamping and spading; (10) minimum finishing and patching, etc.

WRITE TODAY FOR COMPLETE DETAILS

There are Medium Duty, All Purpose or Heavy Duty Master High Frequency Constant Speed Vibrators in Gas or Electric Models to meet every need . . . together with a complete line of Concrete Surfacing Attachments and High Speed Tools.
Write for Bulletin No. 528.

ACCEPTED AS STANDARD EQUIPMENT BY CONTRACTORS & ENGINEERS THROUGHOUT THE WORLD

Master High Frequency Constant Speed Concrete Vibrators are no experiment. *They have been proved on every type of construction job for many years. Even under the most adverse operating conditions they provide constant operation over long periods of time.*

MASTER VIBRATOR COMPANY
Dayton 1, Ohio • Distributors throughout United States and Canada
Products Include: Concrete Vibrators Gas or Electric Surfacing Attachments, High Speed Tools • Vibratory Concrete Finishing Screeds • Rotary Concrete Floor Finishing Machines • Portable Gas Electric Generator Plants, 500 Watt to 17000 Watt, Voltage Regulators and Portable Mountings Optional • Master Flood and Shovel Lights • Electric or Gas Engine Driven Power Blow Hammers

(*Continued from page* **130**)

shingles. Extent of mechanical installations is indicated by the figures for a sprinkler system totaling 300,000 lin.ft. of pipe, 280,000 ft. of 1- to 8-in. pipe inside the building and 20,000 ft. of 12- to 16-in. underground. In connection with the buildings the contractors had to put in miles of underground utilities, including concrete pipe sewers up to 54-in. diameter.

About 6,000,000 cu.yd. of hydraulic fill was put in by the Defense Plant Corp. with three 27-in. dredges, privately-owned units obtained through the cooperation of the New Orleans district office

TRUCK-MIXER delivers concrete inside manufacturing building. This load is being transported by wheelbarrow from mixer to service trenches.

of the U. S. Engineers, and one 20-in. dredge rented directly from Jahncke Service, Inc. Pumping fine material from the canal and basin, the dredges pumped 25 to 30 percent solids. In 45 days between March 28 and May 12 the dredges placed 4,400,000 cu.yd. of hydraulic fill.

Working Force

To maintain scheduled progress, the contractors employed a total of about 5,000 workers, nearly all of whom worked 8-hr. shifts six days a week. Certain crews, such as the erection force of the structural steel subcontractor, worked a 10-hr. day. Including office workers, the general contractors employed about 3,500, and the subcontractors about 1,500.

Nearly 11,000 tons of structural steel went into the frame of the manufacturing building. Throughout the many acres

(*Continued on page* **134**)

MACMILLAN RING-FREE WILL DO A BETTER LUBRICATING JOB

MAKE US PROVE IT!

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION

50 West 50th Street, New York 20, N. Y.; 624 S. Michigan Ave., Chicago 5, Ill.; 530 W 6th St., Los Angeles 14, Cal.

Copyright 1944, Macmillan Petroleum Corp.

(*Continued from page* 132)

inclosed by this structure, the clearance under the lower chords of the roof trusses is 40 ft. In the assembly area of this building, columns are spaced 105x125 ft., with 125-ft. roof trusses between carrier trusses 105 ft. long.

Manufacturing and sub-assembly operations are housed in an ell of the same building. Columns in this ell are spaced 60x105 ft., and 40x105 ft., with roof trusses 105 ft. long supported between 40- and 60-ft. carrier trusses.

For the manufacturing building, original roof design employing 2-in. t. & g. wood sheathing was changed to precast concrete tile. The roof deck is covered with built-up composition roofing topped by tar gravel. Walls of the building, above the non-reinforced pile-supported grade beams, are 12½-in. brick construction to a height of 10 ft., topped by a precast concrete sill supporting a continuous band of wood sash 7 ft. 9 in. deep. A second horizontal band of wood sash about 7 ft. 6 in. deep is placed in the walls of the building just within the 40-ft. clearance height. The remainder of the wall expanse is closed with 2-in. vertical wood sheathing nailed to timber girts and covered by 14-lb. building

(*Continued on page* 138)

ON EVERY CONSTRUCTION FRONT—

M·S·A·

SKULLGARDS

KEEP HEADS SAFE *ON-THE-JOB!*

IN ACTION on the biggest construction jobs and contracts of every size throughout the nation, these favorite work hats keep men on the job by keeping heads safe. Skullgard's laminated bakelite construction, one-piece molded, provides durability and resistance to impact proved by years of hard service—*comfort* proved by the greatest popularity enjoyed by any protective hat. 8 different models to choose from!

Type K—standard of the industry. Trim "doughboy" shape for all-around protection.

Write

for your copy of this descriptive M.S.A. Skullgard Bulletin. Fully detailed—ask for Bulletin No. DK-11.

MINE SAFETY APPLIANCES CO.

BRADDOCK, THOMAS AND MEADE STREETS

PITTSBURGH, PA.

DISTRICT REPRESENTATIVES IN PRINCIPAL CITIES

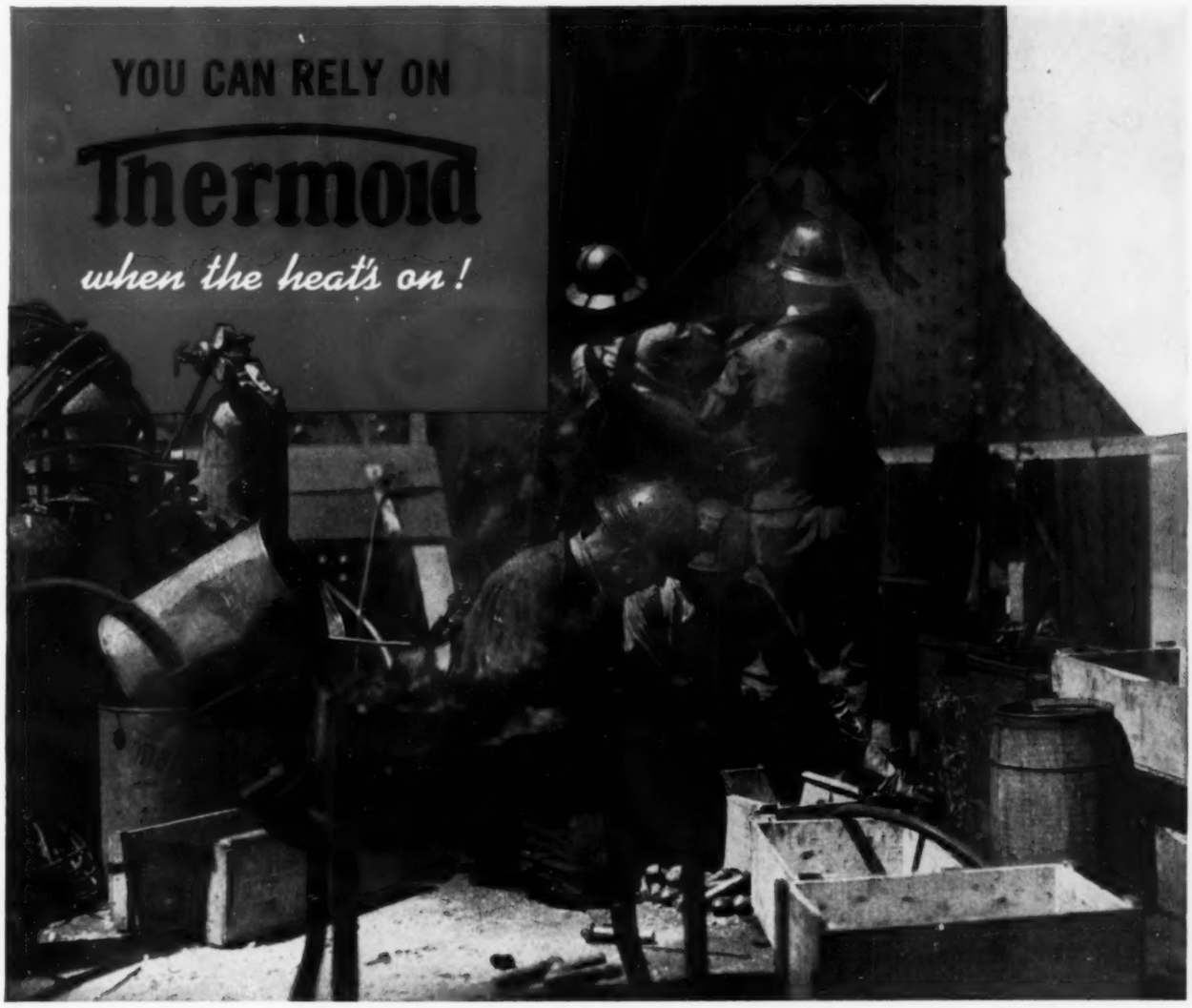
When There's No Time for Breakdowns It's Time to Get a Gorman-Rupp Pump

Today, when time is the essence, you need a Gorman-Rupp Self-Priming Centrifugal Pump more than ever. There is not a quitter among them. The water passage has the same area as the suction hose. Muck, gravel, cinders — you simply can't clog them because solids cannot accumulate. There is no recirculation orifice to clog — no shut-off valve to jam — no hand priming regulator. There isn't a self-priming centrifugal pump made that will outwork a Gorman-Rupp in gallonage or continuous hours. Gas engine or electric motor driven. Capacities up to 125,000 GPH. There is a type and style to fit your every requirement. Stock for immediate delivery in 100 principal cities.

THE GORMAN-RUPP COMPANY, MANSFIELD, OHIO

GORMAN-RUPP

Self-Priming Centrifugal Pumps



FROM skylines to tunnel shafts—and in all the construction fields between—Thermoid Products get the call when the heat is really on.

That's because Thermoid Hose (air, water, suction and steam), Thermoid Conveyor Belting, Industrial Brake Linings and other Thermoid Products are first *designed* for the tough jobs . . . and then *built* to deliver superior service.

Years of trouble-free service have taught most contractors to "rely on Thermoid Products" as a matter of course. We are specially proud that Thermoid Products today are *specified* on leading engineering and construction equipment and other materiel which is helping to speed Victory.

Put it up to Thermoid the next time *you* have a rush job, or one that you've figured with a super-sharp pencil! You'll find then—as always—that It's Good Business To Do Business With Thermoid.

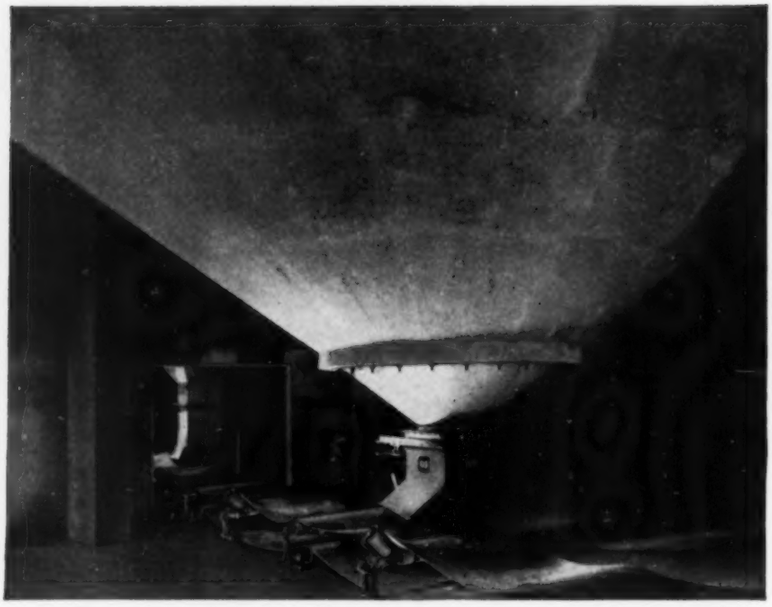
Thermoid Rubber
DIVISION OF THERMOID CO.
TRENTON, NEW JERSEY

THE THERMOID LINE INCLUDES: Transmission Belting • F. H. P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Sheet Packings • Wrapped and Molded Hose • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products.

Don't put it off 'til tomorrow — BUY MORE WAR BONDS TODAY!

If they could do it
. . . so can YOU!

Saves 15 days on a RUSH contract . . . Thousands of soldiers were moving into a nearby army camp. So this telephone building had to be expanded **fast!** With Lehigh Early Strength Cement, the contractor stripped forms quicker and other workmen could get an earlier start. At least 15 days were saved by this quick-action cement.



Concrete takes the place of steel . . . A Chicago contractor was building a 35-bin addition to a grain elevator, when steel went away to war. The milling company couldn't wait. The job **had** to be finished. The hoppers were redesigned for concrete construction—and Lehigh Early Strength Cement finished the job.

$2,000 saved on this hospital! . . . Instead of waiting 21 days before removing forms, only 7 were required. According to the Contractor, Lehigh Early Strength Cement helped put this job back on schedule; saved about $2,000 in overhead, salary, labor costs and forms.

When you can't get other materials . . .

When you must finish the job fast . . .

When you want a better job at lower cost . . .

USE . . .

LEHIGH EARLY STRENGTH CEMENT

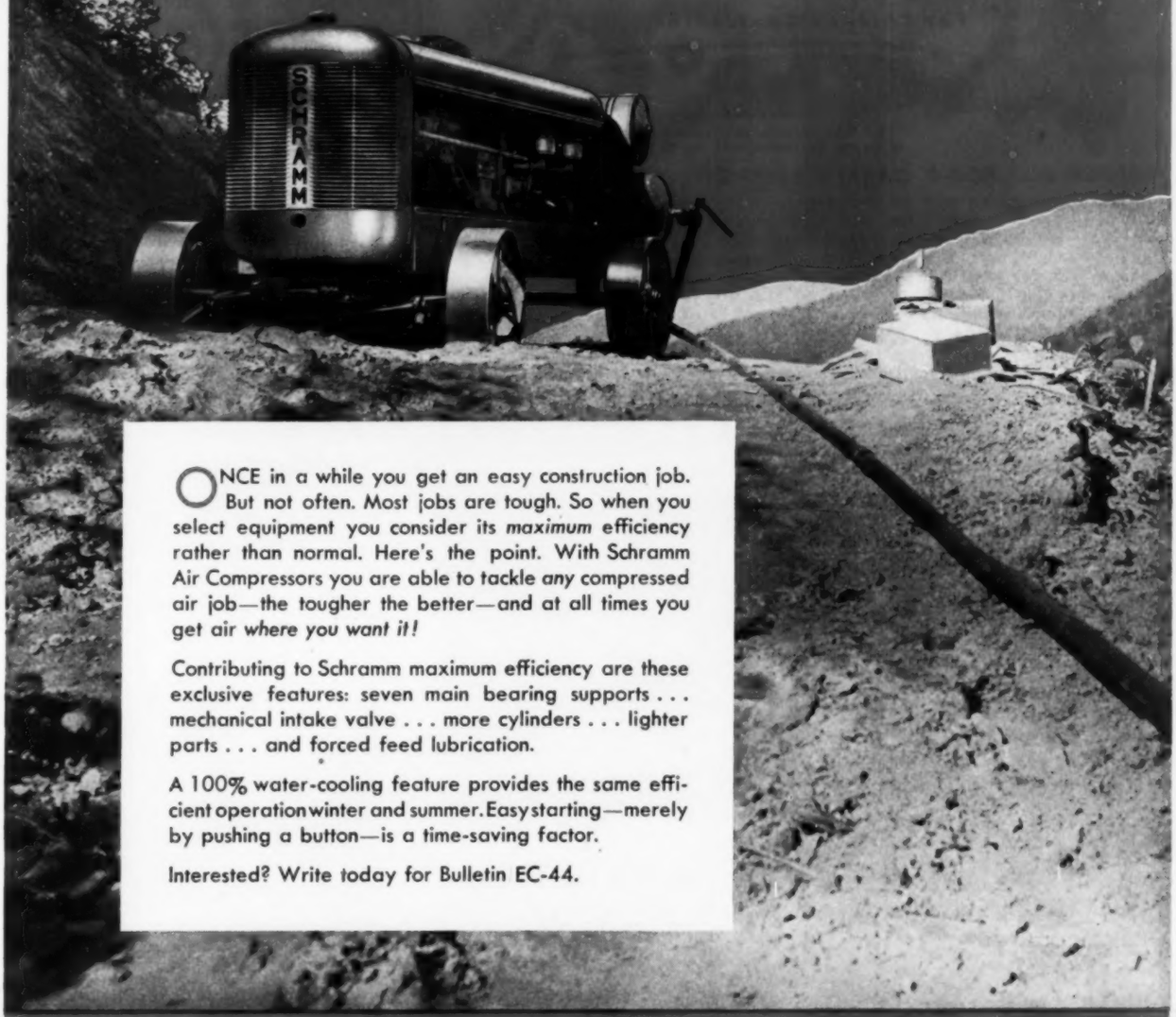
for service strength in a hurry

Lehigh CEMENT

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

The harder the job . . . the more reason for—

SCHRAMM AIR COMPRESSORS



ONCE in a while you get an easy construction job. But not often. Most jobs are tough. So when you select equipment you consider its *maximum* efficiency rather than normal. Here's the point. With Schramm Air Compressors you are able to tackle *any* compressed air job—the tougher the better—and at all times you get air *where you want it!*

Contributing to Schramm maximum efficiency are these exclusive features: seven main bearing supports . . . mechanical intake valve . . . more cylinders . . . lighter parts . . . and forced feed lubrication.

A 100% water-cooling feature provides the same efficient operation winter and summer. Easy starting—merely by pushing a button—is a time-saving factor.

Interested? Write today for Bulletin EC-44.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Mall
REG. U.S. PAT. OFF.

CHAIN SAW
CUTS 60 18" PILES
PER HOUR
For Chicago Contractor

5 H. P. MALL Gasoline Engine Chain Saw—
36" Capacity. Also Available in 24" and 48" Sizes.

A 15-HOUR JOB FOR 2 CARPENTERS WITH A CROSS-CUT SAW

Unskilled laborers can now cut and top piles and square heavy timbers to size with MALL Chain Saws after a few minutes instruction — at a surprisingly low cost. The 2-stroke cycle design gasoline engine starts easily . . . has stall-proof clutch and handle throttle, and uses little fuel. The 360 degree index permits sawing at any angle. Safety guard assures full protection. Pneumatic models also available. Electric, Gasoline Engine and Pneumatic sharpeners are available for sharpening chains in shop or field. *Write for literature and prices.*

MALL TOOL COMPANY, 7757 South Chicago Ave., Chicago 19, Ill.

ARMY E NAVY

Mall REG. U.S. PAT. OFF. PORTABLE POWER TOOLS

because it's 60% thicker up the Center than at the Sides

1. You Get the Strength of a 13 Gauge Shovel with Only 15 Gauge Average Weight.

2. Resists Wear as Well as Breakage

The thicker center extends to the cutting edge where it retards wear-back.

3. Permits Deeper Hang, Better Balance

Thicker socket allows deep bend: load is centered.

THE UNION FORK & HOE COMPANY
655 Hocking Street, Columbus 15, Ohio

RAZOR-BACK® SHOVELS
(THE ORIGINAL TUBULAR SHANK TYPE)

Also Stone, Ballast, Industrial Forks, Asphalt and Road Rakes; Distributors Everywhere.

(*Continued from page* 134)

paper and asbestos-cement shingles. The floor of the building is a 6-in. concrete slab, laid on rolled subgrade of hydraulic fill material and reinforced with ⅜-in. steel rods on 12-in. centers in both directions.

As another example of changes made to save lumber, the veneer mill, originally designed as a timber-frame structure, was built of reinforced concrete. This building, roughly 150x250 ft. in plan, has 32x37½-ft. bays. The roof is concrete slab and joist construction with a slab 3½ in. thick. Roof girders are sloped on the top by increasing the depth toward the ridge, thus giving the slab a slight pitch.

Floor of the veneer mill is a plain concrete slab 7 in. thick laid on a compacted subgrade of hydraulic fill material. Exterior walls are brick to 8-ft. height above the grade beams. Above this level are wood sash and a closure curtain of 2-in. wood sheathing faced on the outside with asbestos-cement siding on a layer of building paper.

Engineering and office buildings for the plant are two-story structures with load-bearing brick exterior walls and interior wood framing. The engineering building, 50 ft. wide x 1,155 ft. long, immediately adjacent to the manufacturing building, has direct access on the first floor to the cafeteria, and on the second floor to the production engineering loft in the latter building. Parallel with the engineering building, and at a short distance from it, is the office building, 50 ft. wide and 840 ft. long. Grade beams and column footings of the two buildings are supported on pile foundations.

Foundation Work

Three Marion steam cranes equipped with steel leads and two skid piledrivers with timber leads drove the 8,000 foundation piles for plant structures. As many as 25 piles were installed under individual footings to support interior column loads of the manufacturing building. Nearly all the piles are untreated timber, cut off below water level, but a few creosoted piles, extending above water level, were driven at the boiler house and a sewage disposal plant.

Because of obstructions offered by buried cypress stumps, much of the excavation was made by hand. Wood sheeting, driven to increased depth by sheeting hammers as excavation proceeded, held the sides of the holes. A varied assortment of pumps in 2-, 3- and 4-in. sizes removed inflowing water from sumps in the excavations. The general contractors used 30 pumps and 20 sheet-

(*Continued on page* 140)

TYPICAL DIESEL LUBRICATION PROBLEMS:

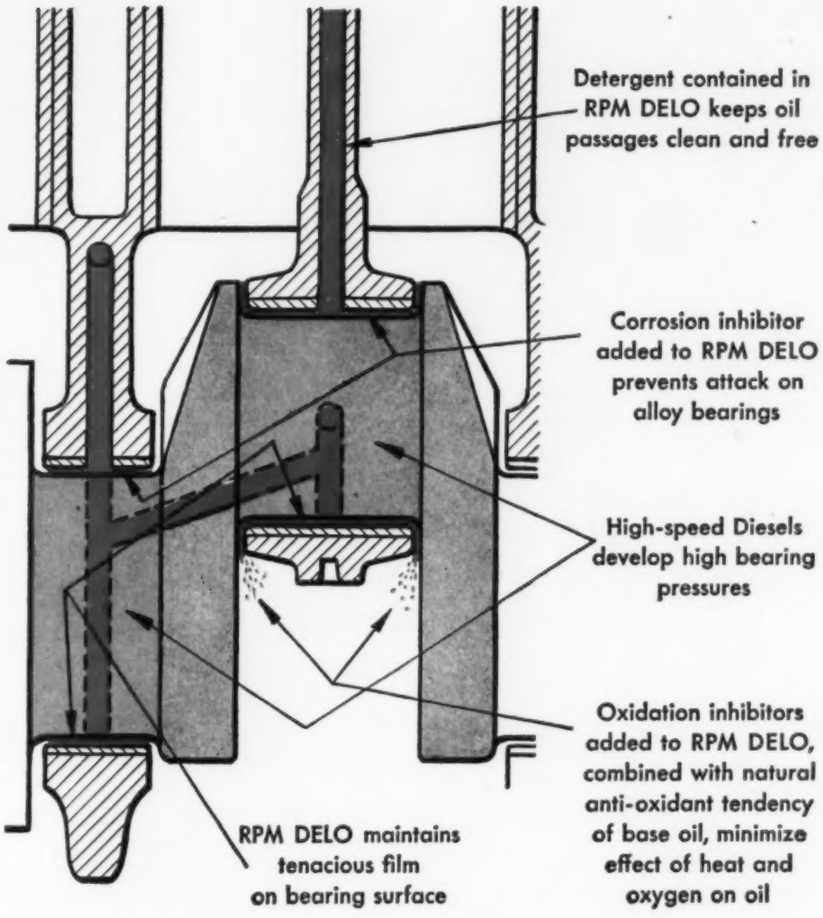
2. Bearing Corrosion

The high speeds of automotive Diesel engines have increased the loads on bearings to such an extent that copper-lead and other alloy bearings are widely used. These bearings, although able to withstand far greater pressures and higher temperatures than the conventional babbitt type, are subject to corrosion.

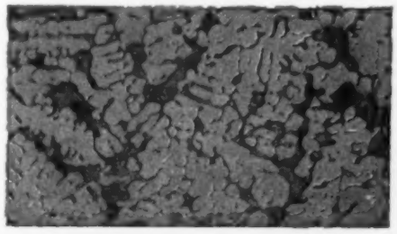
These same conditions of pressure and temperature promote a reaction between the lubricating oil and the air in the crankcase. When a hydrocarbon lubricating oil is exposed to oxygen at elevated temperatures, the oxygen atoms combine with the oil molecules. With some lubricating oils, this reaction causes them to become corrosive.

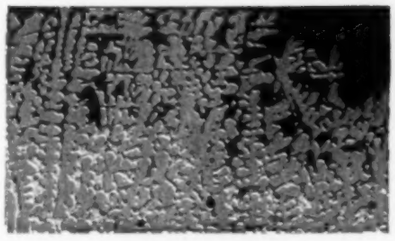
The products formed in this reaction tend to dissolve the lead in the copper-lead structure of the bearing, leaving a porous copper shell which breaks down under pressure.

This tendency, which presents a serious problem to operators of high-speed Diesels, can be entirely overcome through use of RPM DELO in accordance with the recommended procedure.


Detergent contained in RPM DELO keeps oil passages clean and free
Corrosion inhibitor added to RPM DELO prevents attack on alloy bearings
High-speed Diesels develop high bearing pressures
Oxidation inhibitors added to RPM DELO, combined with natural anti-oxidant tendency of base oil, minimize effect of heat and oxygen on oil
RPM DELO maintains tenacious film on bearing surface

Diagrammatic sketch of connecting rod and crankshaft bearing assembly illustrates one section of engine where RPM DELO reduces overhaul and repair expense.





Top Photo: A photomicrographic cross-section shows the lead component of a new copper-lead bearing in light grey. The copper is shown as red. Note the even distribution throughout.

Bottom Photo: A similar cross-section corroded by use of straight, uncompounded mineral oil. Note how lead has been eaten from surface, leaving copper honeycomb.

RPM DELO, in addition to its other properties, prevents bearing corrosion in three separate ways:

1. The base stock of RPM DELO contains natural inhibitors which are highly resistant to oxygen, and minimize the original tendency of all mineral oils to oxidize under heavy-duty conditions.

2. A powerful oxidation inhibitor is added to RPM DELO, which further reduces the rate at which the oil absorbes oxygen.

3. Direct protection is given to the bearing by the corrosion inhibitor added to RPM DELO.

Even more important than its non-corrosive property, is the ability of RPM DELO to eliminate ring-sticking, prevent excessive deposits on rings and ports, and minimize ring and cylinder wear.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (concentrate). Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity.

RPM DELO

STANDARD OF CALIFORNIA

Even on the simplest operations, fine hand tools pay big dividends — in speed, good workmanship, greater safety. On difficult operations they are indispensable. Everywhere in industry Snap-on tools are giving added efficiency to manpower in production, assembly and service operations. Snap-on's direct-to-user tool service is available through 37 factory branches located in key production centers.
Snap-on Tools
THE CHOICE OF BETTER MECHANICS
SNAP-ON TOOLS CORPORATION, 8084-F 28th Ave., Kenosha, Wisconsin

(*Continued from page 138*)

ing hammers on foundation and trench excavation.

Pumping alone was not sufficient to dry up the bottoms at many of the footings and trenches. Wet excavations of this kind were dried up by placing about 9 in. of oyster shell on the bottom. A thick mat of shell was effective in drying up even the wettest holes.

Truck-Mixed-Concrete

Concrete was mixed and delivered to the buildings by a fleet of twelve 5-yd. truck-mixers under a subcontract with Continental Concrete, Inc., a subsidiary of Cooney Bros., Inc., Tarrytown, N. Y. Equipment of the truck-mixer fleet consisted of 12 Rex mixers mounted on ten Autocars and two Macks. The mixers were loaded at a Johnson batching plant

BATCHING PLANT set up between railroad tracks weighs cement, sand, gravel and water for 5-yd. batch and charges 5-yd. truck-mixer in one operation.

set up beside a railroad siding on the site. Sand, gravel and bulk cement were delivered to the plant by rail. The plant discharged a full 5-yd. batch into a truck-mixer in one operation. Loading 5-yd. batches, the plant had a capacity of about 185 cu.yd. per hr.

Two classes of concrete are used in structures. For 2,500-lb. concrete a 5-yd. batch took 2,505 lb. of cement, 6,605 lb. of sand, and 9,540 lb. of gravel. Weights of dry ingredients for a 5-yd. batch of 3,000-lb. concrete were 2,820 lb. of cement, 6,330 lb. of sand, and 9,120 lb. of gravel. Weigh batchers for sand, gravel

(*Continued on page 142*)

BRIXMENT *Makes More Plastic Mortar*

● One of the most important characteristics any mortar can possess is *plasticity.* Within certain limits, plasticity is the greatest single factor not only in the *economy* of the brickwork, but also in its strength, its neatness, and its resistance to the passage of water.

One of the outstanding characteristics of Brixment mortar is its unusual plasticity. For twenty-five years, bricklayers all over the United States have agreed that the workability of Brixment is comparable to that of straight lime putty. This exceptional plasticity makes it easy for the bricklayer to secure neat, economical brickwork, with the brick properly bedded, and the joints well filled. And because of this unusual plasticity, a bag of Brixment will carry three full cubic feet of sand and still make an ideally workable mortar.

Take some Brixment mortar and some 50-50 lime and cement mortar. Try shoving a full head-joint with each mortar. You'll find that with the Brixment mortar (top), it is much easier to shove the brick accurately into place, with a full head-joint, than it is to do the same thing with the other mortar (bottom).

LOUISVILLE CEMENT COMPANY, Incorporated
General Offices: Louisville 2, Kentucky
Cement Manufacturers Since 1830

SYMBOL OF QUALITY

For almost 40 years, the well-known Sterling "S", stamped on the back of every Sterling Wheelbarrow, has served as a symbol of quality — your definite assurance of obtaining satisfactory material transport service. If you need wheelbarrows today — write us. We'll do the best we can to take care of your urgent requirements.

STERLING WHEELBARROW CO.
MILWAUKEE 14, WISCONSIN, U. S. A.

Sterling Look for the Symbol of Sterling Quality WHEELBARROWS

JACKSON
FLEXIBLE SHAFT
VIBRATORS

. . . are the choice of those who want JACKSON standards of quality, dependability and performance. No other flexible shaft vibrator can offer such assurance.

Supplied with a 2⅞" and a 1¾" head. These two heads give user a vibrator efficient in and suitable for a wide range of applications. For instance, from wall sections of comparatively large size to narrow sections.

Model FS-6A, illustrated above, is furnished complete with 7, 14, 21 or 28 feet of shaft. Has dirt-proof turntable base. Supplied with or without wheelbarrow mounting.

Write, wire or telephone for further information

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

(*Continued from page 140*)

and cement were manually controlled, but water was weighed automatically. Aggregate bins in the plant held 250 cu.-yd. of sand and gravel, and bulk cement storage facilities include a 200-bbl. compartment above the batchers and a 1,-500-bbl. reserve silo.

When building construction was most active, the truck-mixer fleet delivered to an average of six locations each day. Concrete requirements never taxed the capacity of the fleet, as the demand never exceeded 1,150 cu.yd. per day. Maximum round-trip haul was about 1½ mi., and the average was about 1 mi.

Steel Erection

To unload, handle and erect structural steel on the job, the Bethlehem Steel Co., subcontractor, used a total of 12 cranes; two 60-ton Industrial steam locomotive cranes with 70-ft. booms, six 40-ton Northwest crawler rigs carrying 90-ft. booms with 15-ft. jibs, and four 15-ton crawler-mounted Industrials with booms about 70 ft. long. Structural steel was fabricated at Buffalo, N. Y., and Pottstown, Pa., and was shipped by rail to be assembled and erected at the site. Including 600 tons of steel for the flight hangar at the airfield, the total quantity for the job was 11,630 tons. Field connections required the driving of about 171,000 rivets in truss assemblies on the ground, and about 87,000 rivets in the air.

Steel framing for the manufacturing building was erected in three months. The heaviest framing was required for the 105x125-ft. bays of the assembly area. Interior columns weighing 200 lb. per ft. were built up of one 18-in. 96-lb. I-section, two 21-in. 59-lb. I's, and four 9x⅜-in. cover plates. The carrier trusses, 105 ft. long and 13 ft. 2 in. deep, have chords made up of 18-in. 96-lb. I's with cover plates. Roof trusses 125 ft. long, framing into the carriers on 17½-ft. centers, are 16 ft. 3 in. deep at the ridge and 13 ft. 2 in. at the ends.

Roof Deck

Without any change in the structural frame of the manufacturing building, the designers substituted for the original 2-in. t.&g. wood roof sheathing a deck of precast concrete channel roof slabs made with light-weight Haydite aggregate. The channel slabs, or roof tiles, are 2 ft. wide and have an average length of 6 ft. 9 in. Accompanying photographs indicate their shape. The web of the channel slab is 1 in. thick, reinforced with galvanized wire mesh, and the flanges at the two edges are 3½ in. deep, rein-

(*Continued on page 146*)

Baker Bulldozer on Allis-Chalmers tractor spreading, leveling and compacting sand on jetty for unloading supply ships! South Pacific.

Baker spreads material for another type of jetty to facilitate landing of barges.

Bulldozers are not fighting equipment. They pack no artillery—they have no protecting armor plate. They don't even enjoy pet names like "Lulu Belle" or "Memphis Mamma," but they are in there—pitching!

Baker Bulldozers are doing all right backing up the Yanks in every theater of war. You will find them right behind the fighting men — filling shell holes—leveling cratered air fields—excavating for underground oil tanks and ammunition dumps—building landing docks—digging drains and foxholes—making themselves useful to the fighting men. Their aid in consolidating positions on beach heads, mountain sides or sand dunes is hard to over-estimate.

Commanders of task forces have learned that it is almost as important to have bulldozers as tanks in the holds of their LST ships. Bulldozers have won their spurs and Baker Bulldozers, because of their fast, positive hydraulic control, dependability and rugged design stand high on the honor roll.

It's true that supporting our fighting forces is a full time job for Baker Bulldozers *NOW*. But just as soon as our enemies are vanquished, you will find the Baker ready to perform equally notable feats on your contracts. Send for a copy of "Unsung Heroes of War."

THE BAKER MFG. CO.
568 Stanford Ave.
SPRINGFIELD, ILL.

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

MONOTUBE

the

All-Steel *Tapered*

PILE CASING

with **4**

Outstanding Features that speed your work

Quick Inspection

Hollow, tubular design enables quick, thorough inspection from top to toe prior to concreting.

Fast Handling

Monotubes are light in weight and can be handled quickly and economically.

Easy Extension

Monotubes are designed so that they may be easily extended in the field to make possible the quick installation of varying pile lengths.

Simplified Driving

Monotubes are so strong and rigid they require no heavy core or mandrel — can be driven with average job equipment.

Monotubes are available in a gauge, size, and taper to meet the most exacting requirements in any soil condition. Monotube

Catalog 68A containing full details is free on request to The Union Metal Manufacturing Co., Canton 5, Ohio.

UNION METAL

Monotube Pile Casings

How TOURNAPULL SPEED cuts Costs and increases Profits

You can profitably handle both long and short hauls . . . move more yardage with fewer units . . . save on equipment cost and get lower net cost per yard.

Tournapulls, like all big-capacity scrapers, are designed for pusher loading. They load quickly, haul and spread their own loads, are one-man operated. Because of their large diameter pneumatic tires of large cross section — plus low pressure and greater ground area — Tournapulls operate over concrete without surface damage, travel between jobs under their own power, thus save on freight.

TOURNAPULLS operate from 2.6 to 14.9 m.p.h. — that's 2 to 3 times faster than the fastest tractors. Chart here shows what this greater speed can mean to you in extra yardage.

ONE-WAY HAUL DISTANCE—CU. YDS. PER HOUR*

Tractor-drawn Scrapers:	400′	600′	800′	1,000′	2,000′	3,000′	4,000′	5,000′	6,000′
30-Yd. Capacity	—	—	175	153	97	71	56	46	39
23-Yd. Capacity	—	187	162	142	89	65	51	—	—
18-Yd. Capacity	196	163	139	122	74	—	—	—	—
15-Yd. Capacity	170	142	121	106	65	—	—	—	—
With 15-Yd. Super C Tournapull you get:	200	180	168	156	116	91	76	65	55

*All units pusher loaded on level.

Note that even on short hauls — 400 to 1000 feet one-way — Tournapulls compete very favorably with larger tractor-scraper outfits. While on longer hauls — 2000 to 6000 feet — Tournapulls move from 19% to 41% more than even a 30-yard tractor-scraper outfit — with less first cost and less cost per yard.

Figure 10,000-Hour Profit

As an example, take the extra yardage a Tournapull will move over a 10,000-hour working life on a 2000-foot, one-way haul. It varies from 190,000 to 510,000 pay yards, depending on comparative scraper size. *Estimate the profit to yourself on this extra yardage at your own usual bid price!* Can you afford to use more expensive, slower-moving rigs, when this *extra yardage* can be yours with the fast-moving, rubber-tired power of Tournapulls? Figure NOW to use job-proved Tournapulls on your postwar jobs. It will pay you—in first cost, lower cost per yard and greater profit each working hour.

LETOURNEAU TOURNAPULLS

PEORIA, ILLINOIS · STOCKTON, CALIFORNIA

Also, LeTOURNEAU (Aust.) Pty., Ltd., Rydalmere, New South Wales, Australia

RUBBER-TIRED POWER FOR FASTER EARTHMOVING

Mfrs. of TOURNAPULLS*, DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TOURNACRANES*.

*Trade Mark Reg. U. S. Pat. Off.

AN ECONOMICAL
Portable
MIXING PLANT
for Low-Cost
BITUMINOUS MIXTURES

Simple design, with a minimum of working parts and sturdy construction throughout, makes possible a low first cost and insures long life, low maintenance and rock bottom cost-per-ton of mixed material. Batch weighing of both aggregate and asphalt is standard, but these plants may also be equipped with our Fluidometer System for automatic operation. . . . Knock-down construction with removable bin makes possible easy moving by truck or trailer. Operates with gasoline, Diesel, steam or electric power.

400 to 8,000
LB. CAPACITIES
•
OUTPUT CAPACITY
up to 250 Tons Per Hour

New Bulletin C-44 gives complete information and specifications. Write for it.

HETHERINGTON & BERNER INC.
America's First Builders of Asphalt Mixing Plants
701-45 Kentucky Ave. • Indianaplis 7, Ind.

Hetherington & Berner

The Most
Versatile of
Heavy Duty Jacks

No. 310A. 15-tons capacity; height 22", lift 14", toe lift min. 2¼".

A maximum range of jobs can be handled with this Simplex Emergency Jack. Lifts or pushes vertically, horizontally or from any angle. Tilts on base. Lifts on cap, corrugated toe or adjustable shoe that engages in cap, or from any intermediate height by using the chain as a sling. Double lever socket provides close quarter operation. Ask for new Catalog No. 44.

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

Templeton, Kenly & Co., Chicago (44), Ill.
Better, Safer Jacks Since 1899

(*Continued from page* 142)

forced with one deformed bar in each flange. Weight of the channel slabs is 13 lb. per sq.ft.; a 6-ft. 9-in. channel weighs 165 lb.

According to the specifications, the precast roof slabs were manufactured by vibrating in metal molds a concrete containing a special light-weight aggregate made from a shale which had been burned to incipient fusion and expanded into cellular form, thoroughly vitrified and graded for maximum density. The slabs were supplied and placed by three joint subcontractors: the Cement Tile Corp., Chicago; the Precast Slab & Tile Co., St. Louis, Mo.; and Truscon Laboratories, Inc., Detroit, Mich.

Purlins supporting the slabs are spaced about 6½ to 7 ft. c. to c. In the process of manufacture the precast slabs were cored for nailing to the purlins, specifications requiring not less than four nails per roof slab. Steel purlins of the roof frame were fitted with wood nailing strips; the intermediate purlins are 4x12-

BRICK SKIP is hoisted by crane to second floor of engineering building, where skip is lowered and front bridle is detached to permit crane to dump load.

in., and 6x12-in. yellow pine. The holes in the precast slab were cored on a slant to point the nails toward the heart of the purlin. As indicated by the photographs, ends of the flanges are dapped slightly where they bear on the purlins. In attaching the slabs to the purlins, the roof deck crews used 40-penny nails on 6x12-in. purlins and 30-penny on 4x12-in. purlins.

After the roof slabs had been nailed in place, joints between the slabs were

(*Continued on page* 148)

A "LAZY" OIL DID THIS!

. . . keep your engines on the "go" with hard-working TALPEX

THE "SOFTER," heavily loaded bearings encountered today mean oil has a bigger-than-ever job to do.

It's no job for a "lazy" oil. That's what happened to the badly corroded bearing you see above . . . it was lubricated by a "lazy" oil . . . an oil that didn't have *all* of the properties necessary to efficient engine operation.

Guard against this happening to your engines. Use new Shell Talpex . . . the hard-working oil that has *all* the properties needed to operate an engine with utmost efficiency.

NEW SHELL TALPEX

Is Non-Corrosive to alloy bearings. Protects *all* lubricated engine parts against corrosion.

Has Exceptional Oxidation Stability. Holds to a minimum the formation of sludge, lacquer and other deterioration particles.

Has High Detergency. Helps keep carbon lacquer and foreign particles from adhering to pistons and rings, valves, ports.

Has Low Carbon-Forming Tendencies. Reduces ring sticking and wear. Lengthens engine life.

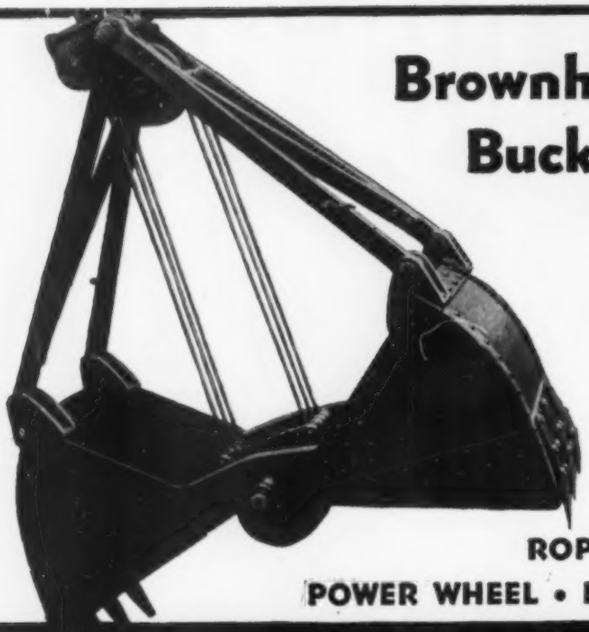
If the oil you now use does not have *all* these properties it's a "lazy" oil . . . should be changed to hard-working Shell Talpex. Ask the Shell man to show you why.

SHELL

TALPEX

THE NEW, ALL-PURPOSE, HEAVY-DUTY LUBRICANT

For trucks, busses, tractors, shovels, stationary and marine Diesels



Brownhoist Buckets

ROPE REEVE • POWER WHEEL • LINK TYPE

Handling ore, gravel, coal or dirt Brownhoist Buckets do a better job because: 1) Larger sheaves reduce rope wear, 2) Heavy carbon-steel digging lips take deep clean bites, 3) Extra-sturdy construction insures long-life. Write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

Light enough to handle . . heavy enough to "take it". These HIGHLY PORTABLE CMC's have proven their durability and sturdiness on important jobs all over the world. They are "first choice" Mixers in peace or war. All standard sizes. Get information.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa
Mixers • Pumps • Hoists • Batching & Placing Equipment • Saws • Carts • Barrows

UNION

EST. 1900
Union Iron Works, Inc.
ELIZABETH, New Jersey

(*Continued from page 146*)

sealed by filling the upper portion of the joints with asphalt mastic cement having a melting point not less than 225 deg. F. On top of the slab deck was placed an insulating layer of Vermiculite (mica) blanket 1 in. thick, laid in a mopping of hot pitch. Over the insulation the Holzer Sheet Metal Works, subcontractor, New Orleans, placed a Barrett 15-yr. built-up composition tar gravel roof guaranteed for 5 years.

Fabric flashing was used throughout the job except in certain places where a more rigid type was needed. Expansion joints in the roof have a three-ply expansion covering of smooth-surface asbestos roofing protected by a hood.

Supported on the roof framing are six transformer stations and 43 dehumidifier houses, about 38x24 ft. in plan. To allow for the weight of equipment installed in them, these houses are made as light as possible. They have steel frames with metal roof deck, which is lighter than precast slabs, and walls of corrugated asbestos-cement.

Erecting Curtain Walls

Air inside the manufacturing building is to be conditioned by dehumidification in the roof dehumidifier houses, and wood sash in the exterior walls accordingly are fixed to remain permanently closed. To erect sash, sheathing and siding above the 10-ft. brick walls to total height of about 56 ft., the contractors used tubular steel scaffold of the Patent Scaffold Co., in sufficient quantities to permit working on about 50,000 sq.ft. of wall at one time. Before setting the wood sash, carpenters nailed the 2-in. vertical wood sheathing to 4x10-in. and 4x12-in. timber girts, bolted to clip angles on the steel columns, and covered the sheathing with 14-lb. building paper and 12x36-in. Flintkote asbestos-cement shingles.

In the exterior wall at one end of three 125-ft. aisles in the assembly area are three canopy-type overhead doors 125 ft. wide and 40 ft. high, supplied by the Truscon Steel Co. In addition, the building has 27 smaller vertical lift doors, 14 ft. 9½ in. wide and 18 ft. 2½ in. high, furnished by the Overhead Door Co. A number of these doors serve an unloading platform along one side of the manufacturing and sub-assembly area. This platform is covered by a wood canopy suspended by steel-angle hangers from the columns. The canopy extends out 22½ ft. from the center line of the columns.

With the tubular steel scaffolding on the exterior walls, the contractors used six scaffold hoist rigs to raise materials to the workmen on the upper platform. Inside the building, six rolling scaffold

(*Continued on page 154*)

4 MOTO-CRANES

TEAM-UP TO ERECT LONGEST WOOD ROOF TRUSSES EVER BUILT

USING 4 Moto-Cranes to raise thirty-one 200 ft. wood roof trusses on the new Ryan Aeronautical Final Assembly Building in San Diego, is a liftable idea submitted by R. E. Hazard & Sons, owners of 12 Lorains.

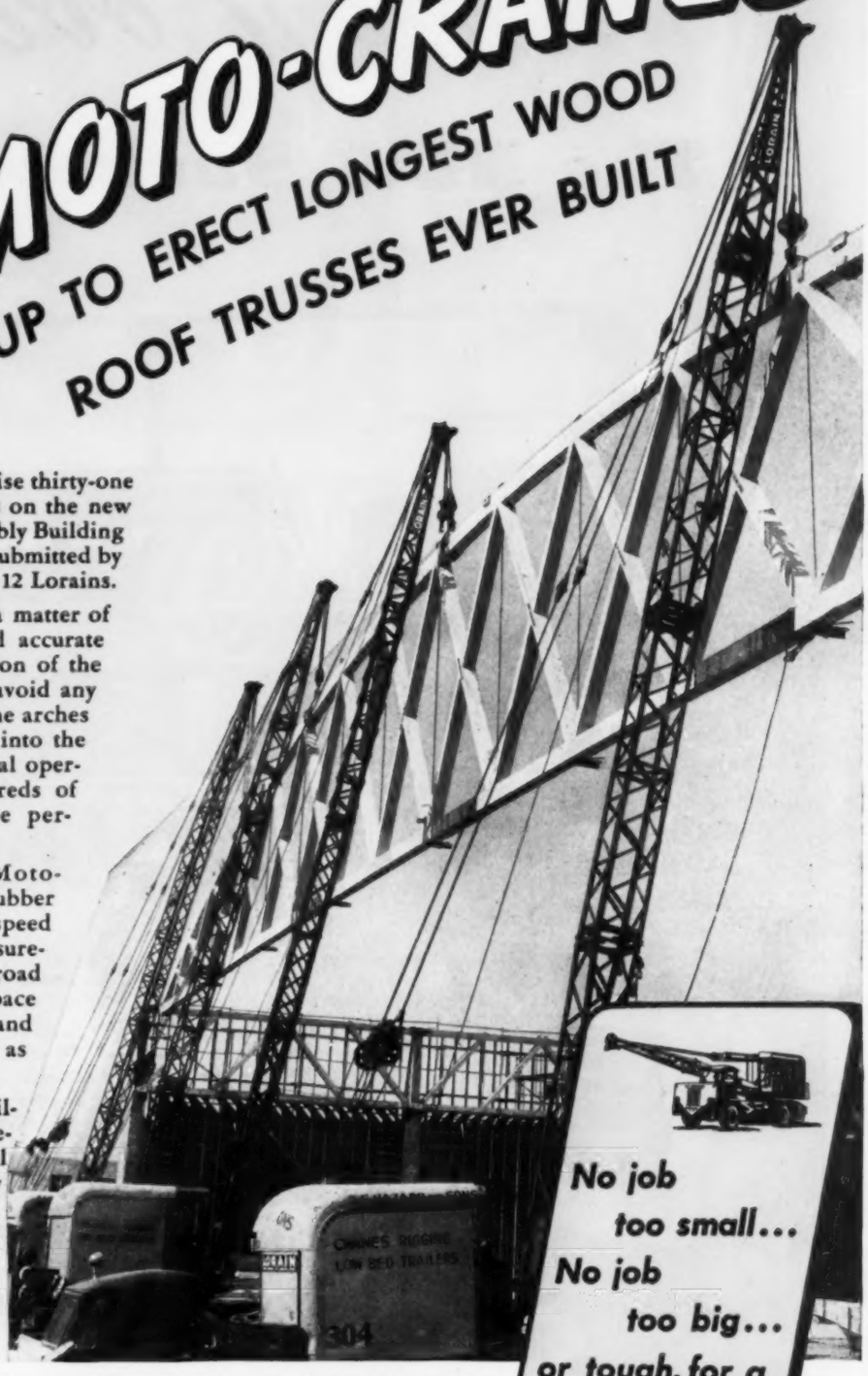
This job was not so much a matter of weight as one of mobility and accurate boom control. Equal distribution of the load had to be maintained to avoid any distortion or mistreatment of the arches while maneuvering each truss into the heel plate positions—an unusual operation, yet typical of the hundreds of varied jobs Moto-Cranes are performing daily.

Completely mechanized, Moto-Cranes are mounted on 10 rubber tires that cushion as well as speed their travel between jobs—are sure-footed and steady on off-the-road jobs, crawl along at a snail's pace or speed up to 35 M.P.H., and jockey into working position as easily as parking your car.

If mobility and maneuverability are essential on your material handling operations, you'll find it mighty profitable to apply Moto-Crane performance on your postwar jobs. See your Lorain distributor for details.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

Ryan Aeronautical Company Photo



No job too small... No job too big... or tough, for a MOTO-CRANE

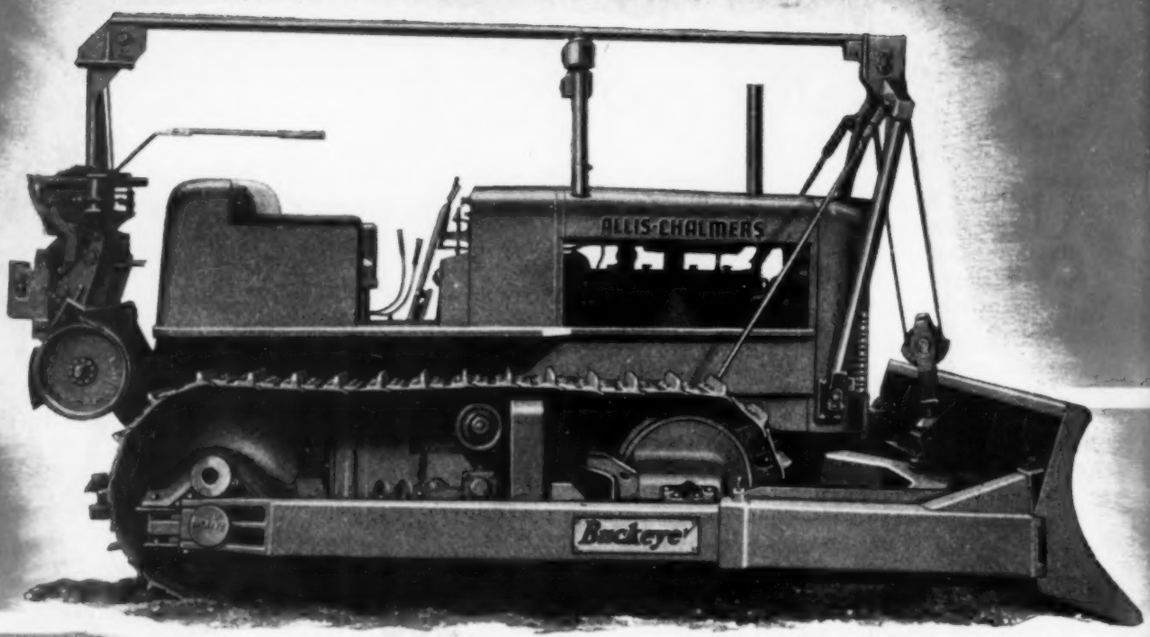
Reg. Trade Mark

thew-Lorain

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

look it over...

The NEW Buckeye Dozer!



This is the NEW Buckeye cable-controlled dozer that is setting higher standards of bulldozer and trailbuilder performance under the toughest possible operating conditions. Hour after hour, testing engineers put it through the most punishing operations with just one thought in mind—"Break the bulldozer." But it couldn't be done! They roll larger yardage loads, punch out boulders, uproot huge trees and stumps, and do a hundred and one odd jobs better than you ever imagined possible.

The single point, center lift suspension of the moldboard permits natural, direct, straight lift of the blade. Full power of the tractor engine is utilized and maximum lifting power provided for the blade.

The new moldboard design packs more strength into less weight. There's no useless excess weight to absorb tractor power. Rigid and fully braced, the moldboard can withstand all types of dozing work. Blade is reversible with replaceable corner bits.

Now available for Allis-Chalmers and Cletrac Tractors. Write for details.

CENTRO-LIF

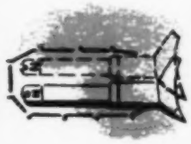
Built by Buckeye

these features mean EXTRA PROFITS

...even on your toughest jobs!

Center Lift, single point suspension — Blade is raised in natural, direct way assuring maximum lifting power. Wear and friction losses are minimized. Design and construction of the new model are simplified. Full power of tractor engine is utilized.

Blade easily angled — With new push arm and horn construction, trailbuilder blade can easily be adjusted to right or left on a single king pin to standard desired angles by removing the two landside pins which hold the blade rigidly in place when angled or straight.

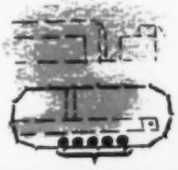


Double Trunnion Tilting — Double trunnion mounting permits either end of trailbuilder or bulldozer blade to be tilted 12" by attaching one push arm to the top trunnion on one side while the opposite arm is attached to the lower trunnion on the other side.

Bigger yardage loads — Scientific blade curvature rolls the load ahead enabling the operator to take deeper cuts — no dead weight — less power required — bigger payloads — moves faster — less strain on tractor — blade digs its own way in like a plow.

Finger-Tip, Split-Second, Fraction-of-an-inch Control — Buckeye Power Control Unit takes hold of the line with a smooth, powerful pull, without any jerking action. Large clutches and brakes, plus external location, mean cool operation and long life.

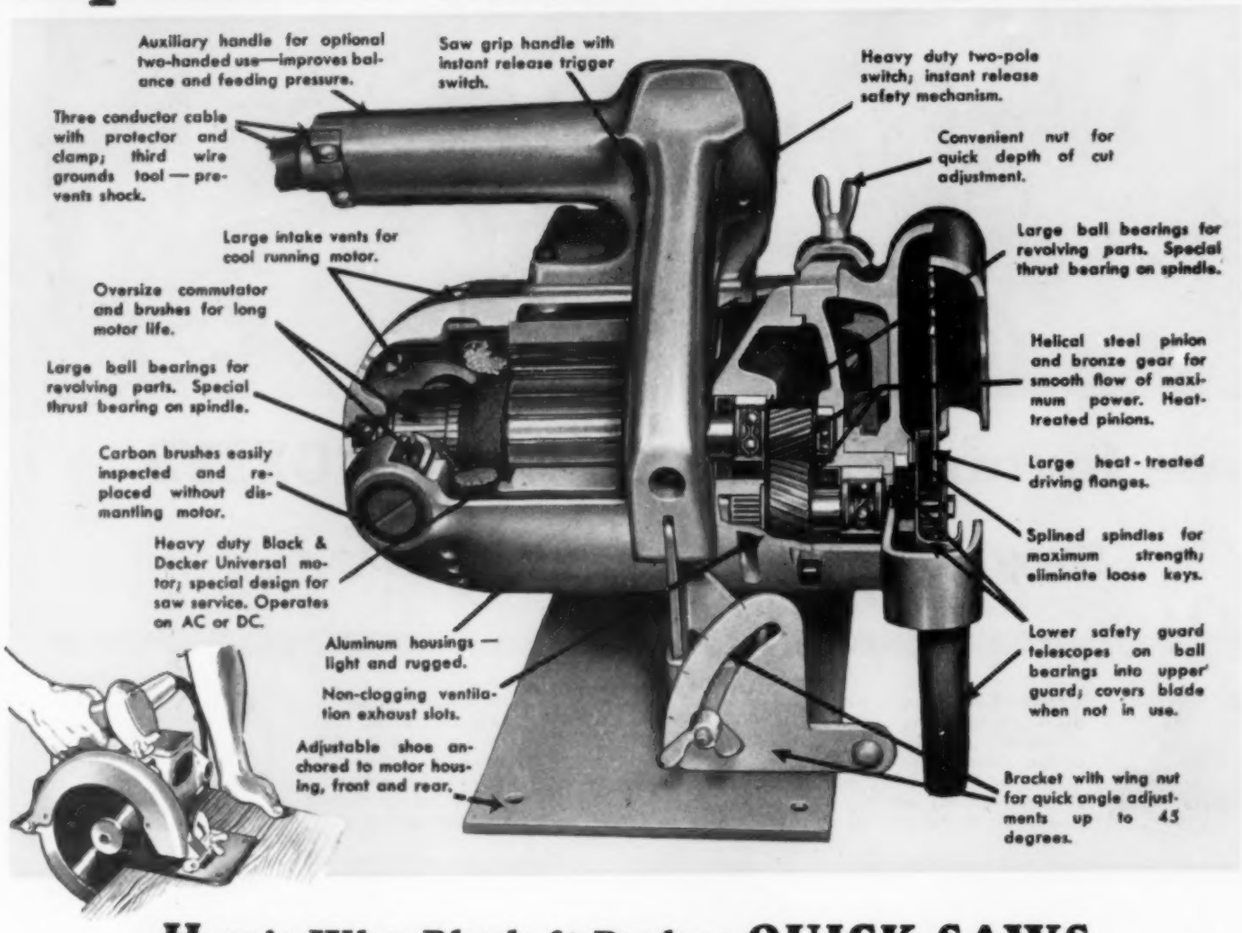
Balanced Design — Full length of crawlers stay on the ground — no lost traction — maximum pushing power assured — mechanical downward pressure not required. Weight is distributed uniformly over each of the crawler shoes on the ground. Blade hugs radiator.



BUCKEYE TRACTION DITCHER CO.

Findlay, Ohio

The Service you get out of tools depends on what's *built into* them


Auxiliary handle for optional two-handed use—improves balance and feeding pressure.
Saw grip handle with instant release trigger switch.
Heavy duty two-pole switch; instant release safety mechanism.
Three conductor cable with protector and clamp; third wire grounds tool — prevents shock.
Convenient nut for quick depth of cut adjustment.
Large intake vents for cool running motor.
Large ball bearings for revolving parts. Special thrust bearing on spindle.
Oversize commutator and brushes for long motor life.
Helical steel pinion and bronze gear for smooth flow of maximum power. Heat-treated pinions.
Large ball bearings for revolving parts. Special thrust bearing on spindle.
Large heat-treated driving flanges.
Carbon brushes easily inspected and replaced without dismantling motor.
Splined spindles for maximum strength; eliminate loose keys.
Heavy duty Black & Decker Universal motor; special design for saw service. Operates on AC or DC.
Lower safety guard telescopes on ball bearings into upper guard; covers blade when not in use.
Aluminum housings — light and rugged.
Non-clogging ventilation exhaust slots.
Adjustable shoe anchored to motor housing, front and rear.
Bracket with wing nut for quick angle adjustments up to 45 degrees.

Here's Why Black & Decker QUICK-SAWS are First Choice with Men Who Know Fine Tools

THE 18 construction features shown above are 18 built-in reasons why so many contractors specify Black & Decker Quick-Saws . . . product of Black & Decker engineering leadership and precision workmanship.

These Black & Decker Saws are ten times as fast as hand sawing. Using a variety of blades and abrasive discs, they crosscut or rip; make all such cuts as angles, grooves, dadoes; and cut a wide variety of materials including tile, ceramics, asbestos-cement, compo-board, corrugated galvanized sheet and light ferrous and non-ferrous metals.

Three Quick-Saw models are available: No. 75, cuts to 2⅜" depth, $105.00; No. 85, cuts to 2⅝" depth, $122.00; No. 95, cuts to 3⅛" depth, $140.00. Black & Decker Quick-Saws may be purchased *on the job* from nearby distributors in all leading cities.

For more information on Black & Decker Electric Tools, mail the coupon at the left today. The Black & Decker Mfg. Co., 759 Pennsylvania Ave., Towson-4, Maryland.

SEND FOR FREE HANDBOOKS!

THE BLACK & DECKER MFG. CO.,
759 PENNSYLVANIA AVE.,
TOWSON-4, MD.

Without obligation, please send me the FREE Handbooks checked below:

☐ SAW HANDBOOK ☐ HAMMER HANDBOOK
☐ 1944 ELECTRIC TOOL CATALOG

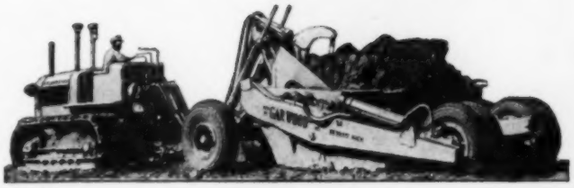
Name.....

Address.....

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

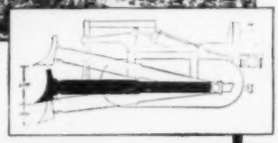


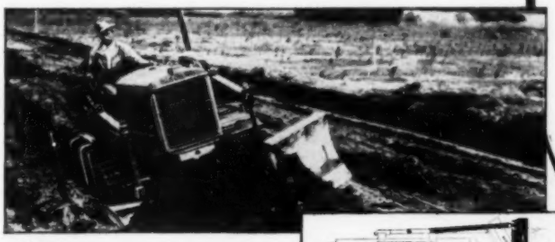
2A 4-wheel hydraulically operated Scrapers for earth moving, specifically constructed for fast digging, easy loading, accurate spreading.

2B 4-wheel cable operated Scrapers for earth moving provide less power to load; greater clearance; flexibility for fast hauls; positive rolling ejection; precision spreading.

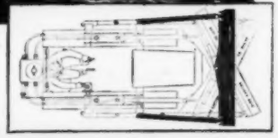
2C 2-wheel hydraulic Scrapers for low-cost, earth moving—dig, load, haul, back dump, make short turns.

2D Bulldozer: Blade fixed for pushing loads ahead.





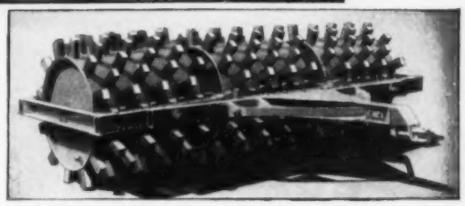
2E Roadbuilders: Blade set to push loads ahead, sidecast loads to left or right.



GAR WOOD Road Machinery

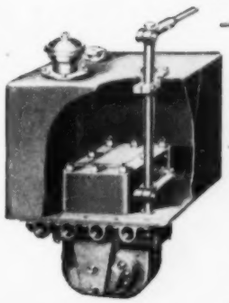
Gar Wood Industries, Inc., manufactures a complete line of heavy-duty, earth-moving machinery: two-wheel Hydraulic Scrapers in 3, 5, 6, and 8 cubic-yard capacities; four-wheel Hydraulic Scrapers in 8, 10, and 15 cubic-yard capacities; four-wheel Cable Scrapers in 11, 15, 20, and 25 cubic-yard capacities; Bulldozers; Roadbuilders; Tamping Rollers; Rippers. Accepted by leading contractors and governmental agencies throughout the world, as meeting all requirements for heavy earth-moving equipment.

Refer to picture number when ordering literature



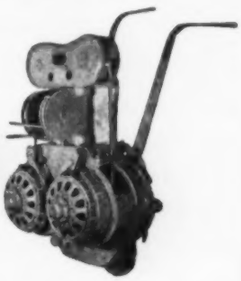
2F Rippers rip compacted earth, shale, rock, roots, old pavements, old roads.

2G Sheep-foot Tamping Rollers built with interchangeable drums (single, double, triple).



2H Hydraulic Control Unit

2J Cable Control Single Drum.



2K Cable Control Double Drum

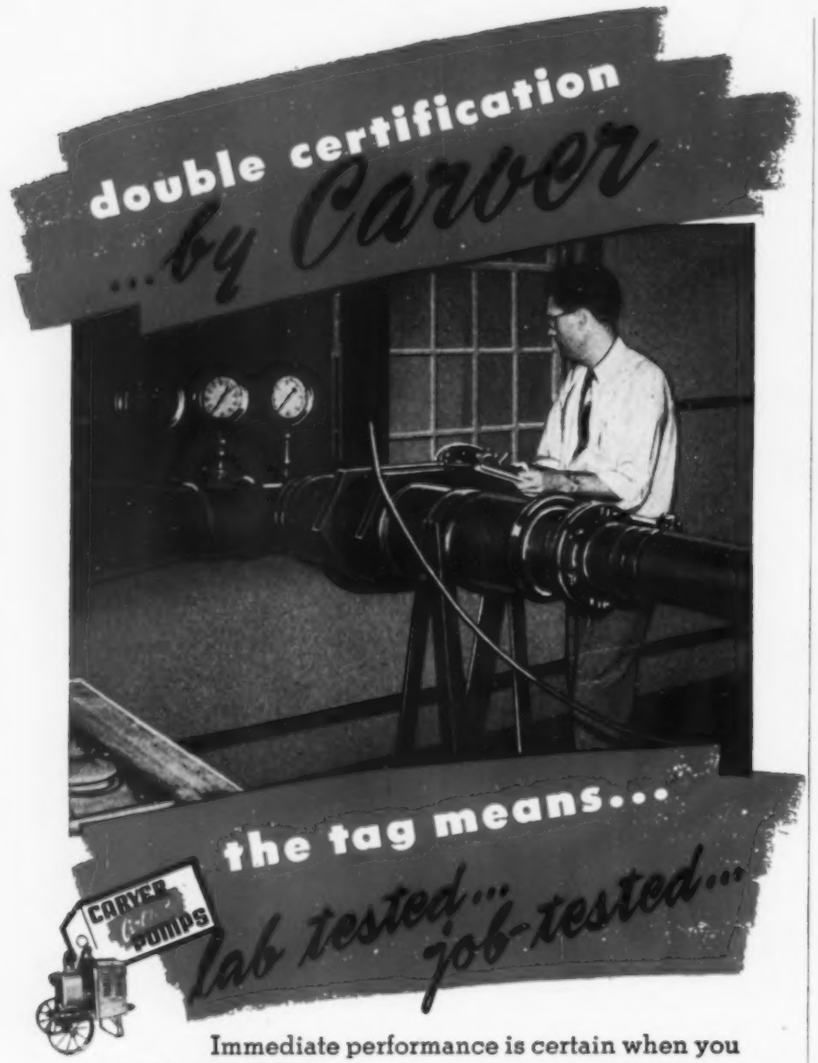
Hydraulic and Cable Control Units for operation of Scrapers, Bulldozers, Roadbuilders, Rippers, for heavy-duty service with track-type tractors.

GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

DETROIT 11, MICHIGAN



Immediate performance is certain when you send a Carver *Certified* Pump out to a job. No back trips for adjustments are necessary — our laboratory tests make sure of that before a pump goes out.

Longtime performance is sure when you put a Carver *Certified* Pump on those tough jobs. Our on-the-job tests have made sure of that—proved that Carver's simplified design with fewer and sturdier wearing parts will pump more, stand more abuse, last longer.

Get more details about the Carver *Certified* Pumps. A new catalog is now ready. Write today.

THE CARVER PUMP CO.
MUSCATINE, IOWA

(*Cotinued from page* 148)

units of similar tubular construction were mounted on wheels to be used by workmen for painting and other overhead work.

Construction Equipment

To keep the job moving at required speed, the general contractors operated a large array of construction equipment, distinct from the equipment used by subcontractors for structural steel and concrete, as noted in separate paragraphs. For hauling materials and supplies, the job was equipped with a total of 265 trucks: 148 1½-ton dump trucks, 78 1½-ton flatbed trucks, 10 1½-ton pole trucks, 4 1½- to 5-ton winch trucks, and 25 ½- to ¾-ton pickup trucks.

Other equipment included the following: 12 draglines, 6 cranes, 1 trenching machine, 26 tractors (19 equipped with bulldozer attachments), 1 road grader, 3 road rollers, 1 sheepsfoot roller, 1 pneumatic-tired roller, 12 portable air compressors, 48 pumps (2- to 8-in. size), 20 sheeting hammers, 25 backfill hammers, 4 pavement breakers, 8 stationary hoists, 18 hand winches and hoists, 9 table saws, 30 power hand saws, 1 stationary wood planer, 3 power hand planes, 2 chain saws, 4 masonry saws, 6 concrete gate hoppers, 14 vibrators, 5 power floor finishers, 3 concrete mixers, 4 welding machines, and 21 light plants (some furnishing power to hand saws and drills).

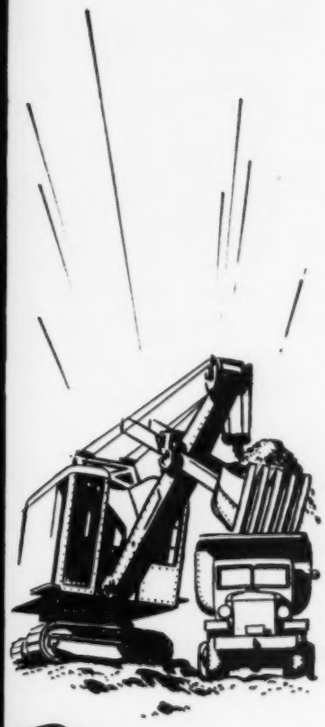
Supervision

Construction of the aircraft plant has been carried out for the Defense Plant Corp. under the direction of George S. Shelley, senior engineer, assisted by Robert E. Copes, supervising engineer. For the Army Air Forces, A. J. Sewart is inspector in charge. The plant is to be operated by Higgins Aircraft, Inc., of which Andrew J. Higgins is president. Representing the operating company on design and construction of the plant are Frank O. Higgins, vice president and general manager, and R. L. Atkinson, Jr., chief plant and facilities engineer.

For Albert Kahn Associated Architects & Engineers, Inc., Detroit, Robert E. Linton, vice president, is in charge of the job as project manager, and James L. Gilroy is superintendent. Operations of the contractors, Turner-Raymond (a combination of the Turner Construction Co. and the Raymond Concrete Pile Co., New York) are supervised by George E. Horr, project manager; James Pinnell, assistant project manager, and Nicholas B. O'Connell, operations manager. Field construction work is directed for the contractors by two general superintendents, W. Conlin and R. Stith.

2300 RPM LATER

For many years, the excessive weight and bulk of cumbersome, slow speed models barred the door to low cost diesel power for many industries and countless types of equipment. But now—2300 RPM later—that barrier has been removed by the high speed diesel. In this trend toward higher horsepower output through higher engine speeds, the Cummins Dependable Diesel has consistently been the trail blazer—the leader. Every day sees this trend continuing . . . just as every day sees Cummins Diesel Power doing the toughest heavy-duty jobs at a lower cost . . . with greater profit.
CUMMINS ENGINE COMPANY, INC., Columbus, Ind.



CUMMINS *Dependable* DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

HEAVY-DUTY MODELS FOR AUTOMOTIVE AND INDUSTRIAL SERVICE

"Can't Say Enough for General Supercrane"

says Henry Selinsky

READY

Here's how easily and economically Contractor Henry Selinsky handles an 80-foot, 3 ton stack with his GENERAL Supercrane, equipped with 100 foot boom.

IN THE AIR

COMPLETE

Resourceful use of his rubber-tired, one engine, one man-operated GENERAL Supercrane is an everyday occurrence with Contractor Henry Selinsky, of Canton, Ohio. For example—

After a hurricane leveled part of a war plant, Selinsky added an extra 50 feet of boom and passed new girders over other buildings (in which war production continued) to complete the new structure in record time.

This 100 foot boom also made quick work of the setting of a new 80 foot, 3 ton stack (as pictured above) and on another war plant job, he handled 13 ton storage tanks fast and accurately, working at an 18-foot radius.

These are typical of how easily and economically the toughest jobs are handled by General Supercranes. Of GENERAL'S dependability and versatility, Selinsky writes: "I can't say enough for the General . . . it's a real crane." For all the aggressive contractors like Henry Selinsky, General has developed the Supercrane one step farther in engineering the "Machine of Tomorrow" which will set new standards of performance in post-war materials handling and construction.

THE OSGOOD COMPANY
SHOVELS, DRAGLINES
CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC

Associated with The Osgood Company

GENERAL EXCAVATOR CO.
CRANES-SHOVELS GENERAL MARION OHIO U.S.A. OSGOOD
MARION, OHIO

GENERAL
CRANES, DRAGLINES
AND SHOVELS
DIESEL, GAS, ELECTRIC

SAVINGS ARE MEASURED IN EXTRA YARDAGES

WITH WOOLDRIDGE TERRA CLIPPER SCRAPERS

With less down-time for repair and much less cable wear, Wooldridge Terra-Clipper Scrapers stay on the job, hauling more heaping yardage loads—day in and day out—year in and year out. Faster loading and faster dumping results in faster round trip hauls from the cut to the fill and back. Extra yardages plus maximum savings in manpower, equipment and maintenance adds up to lower yardage costs. When you want to move more dirt in less time specify and rely on Wooldridge Scrapers.

WOOLDRIDGE Heavy Duty Earth-moving scrapers are built in sizes ranging from 4 to 30 cu. yard capacities. WOOLDRIDGE Scrapers operate on the pivot-tilt forced load ejection principle.

***INVESTIGATE TODAY*—THEN SPECIFY WOOLDRIDGE WHEN YOU BUY**

BOILING BOWL TERRA CLIPPER PRINCIPLE SCRAPERS

WOOLDRIDGE

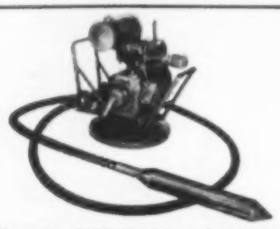
MANUFACTURING COMPANY • SUNNYVALE, CALIFORNIA

SCRAPERS • POWER UNITS • BULLDOZERS • RIPPERS • TRAIL BUILDERS

WHERE TO BUY

Featuring additional Products and Specialties for the Construction Industry

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write For Job Estimate and 32 page Catalog
COMPLETE
MACHINERY & EQUIPMENT CO., Inc.
36-36 11th St., Long Island City, N. Y.
Tel. IRonsides 6-8600
Branch: Third Avenue & Adams St., Gary, Indiana
Telephone: Gary 23983



Concrete VIBRATORS and Grinders
Write for Circular on types, sizes and prices
White Mfg. Co.
ELKHART INDIANA

SEARCHLIGHT SECTION

POSITIONS WANTED

SECRETARY: Efficient, personable young woman capable assuming general building contractor's entire office routine responsibilities, including double-entry bookkeeping. Metropolitan area. Prefer 5-day week. PW-147, Construction Methods, 330 West 42nd St., New York 18, N. Y.

Advertisers in this issue

Adams Co., J. D. 85
Aircraft & Diesel Equip. Corp. 112
Alemite Div., Stewart Warner Co. 18
Allis-Chalmers Mfg. Co. 80, 81
American Bosch Corp. 8
American Cable Division
American Chain & Cable Co., Inc. ..... 3rd Cover
American Chain & Cable Co., Inc.
(American Cable Division) ..... 3rd Cover
American Hoist & Derrick Co. 117
American Steel & Wire Co. 46
Armstrong Bros. Tool Co. 106
Associated Equipment Distributors 22
Athey Truss Wheel Co. 16
Atlas Powder Co. 116
Austin-Western Company 26, 27

Baker Mfg. Co., The 143
Barber-Greene Co. 103
Bay City Shovels, Inc. 91
Bethlehem Steel Co. 99
Black & Decker Mfg. Co. 152
Blaw-Knox Div. of Blaw-Knox Co. 20, 21
Briggs & Stratton Corp. 92
Buckeye Traction Ditcher Co., The 150, 151
Bucyrus-Erie Co. 42, 97
Byers Machine Co. 98

Calcium Chloride Association 101
Carver Pump Co., The 154
Caterpillar Tractor Co. 15
C. H. & E. Mfg. Co. 112
Chain Belt Company 121
Chevrolet Motor Div., General Motors Corp. 35
Cleveland Pneumatic Tool Co., The, and Subsidiaries 9
Cleveland Trencher Co., The 118
Climax Engineering Co. 105
Clipper Mfg. Co., The 96
Clyde Iron Works, Inc. 43
Coast Metals, Inc. 96
Complete Machinery & Equip. Co., Inc. 158
Construction Machinery Co. 148
Cummins Engine Co. 155

Diamond Chain & Mfg. Co. 37
Dixie Cup Company 128

Electric Tamper & Equip. Co. 142
Euclid Road Machinery Co., The 7

Foote Company, Inc., The 115

Galion Iron Works & Mfg. Co., The 131
Gar Wood Industries, Inc. 153
General Electric Co. 17
General Excavator Co. 156
General Motors Corp.
(Chevrolet Motor Div.) 25
(Electro-Motive Div.) 100
Goodrich Co., B. F. 40
Goodyear Tire & Rubber Co. 48
Gorman-Rupp Co. 134
Griffin Equipment & Supply Corp. 110
Griffin Wellpoint Corp. 124
Gulf Refining Co. 90
Gustin-Bacon Manufacturing Co. 87

Haiss Mfg. Co., Inc., Geo. 11
Harnischfeger Corporation 111
Heil Company, The 88, 89
Hercules Roller Co., The 98
Hetherington & Berner, Inc. 146
Huber Mfg. Co., The 32

Independent Pneumatic Tool Co. 119, 127
Industrial Brownhoist Corp. 148
Inland Steel Co. ..... 2nd Cover
Insley Mfg. Corp. 120
Iowa Manufacturing Co. 41
Isaacson Iron Works 25

Jaeger Machine Co., The 13
Johnson Company, The C. S. 126

Koehring Company, The 109

LaPlant-Choate Mfg. Co., Inc. 14
Laughlin Co., The Thomas 102
Lehigh Portland Cement Co. 136
Leschen & Sons Rope Co., A. 19
Le Tourneau, Inc., R. G. 145
Lidgerwood Mfg. Co. 122
Lima Locomotive Works, Inc. 125
Link-Belt Speeder Corp. 39
Lone Star Cement Corp. 5
Louisville Cement Co. 141
Lowell Wrench Co. 45
Lufkin Rule Co., The 130

Macmillan Petroleum Corp. 133
Macwhyte Co. 94
Mall Tool Co. 138
Master Vibrator Co. 132
McGraw-Hill Book Co., Inc. 104, 126
Mercer-Robinson Co., Inc. 118
Michigan Power Shovel Co. 47
Mine Safety Appliances Co. 134
Mir-O-Col Alloy Co. 86
Moretrench Corp. 33

National Gunite Corp. 130
Northwest Engineering Co. 29
Novo Engine Co. 106

Oakite Products, Inc. 126
Osgood Co., The 156
Owen Bucket Co., The 122

Page Engineering Co. 30
Parsons Co., The 114
Preformed Wire Rope 28

Ransome Machinery Co. 95
Rogers Bros. Corp. 132

Schramm, Inc. 137
Seaman Motors Co. 107
Searchlight Section 158
Shell Oil Company 147
Shunk Manufacturing Co. 114
Sinclair Refining Co. 38
Snap-on Tools Corp. 140
Socony-Vacuum Oil Co., Inc. 23
Sonoco Products Co. 112
Standard Oil Co. (California) 139
Standard Oil Co. (Indiana) 108
Sterling Machinery Corp. 158
Sterling Wheelbarrow Co. 142
Syntron Company 130

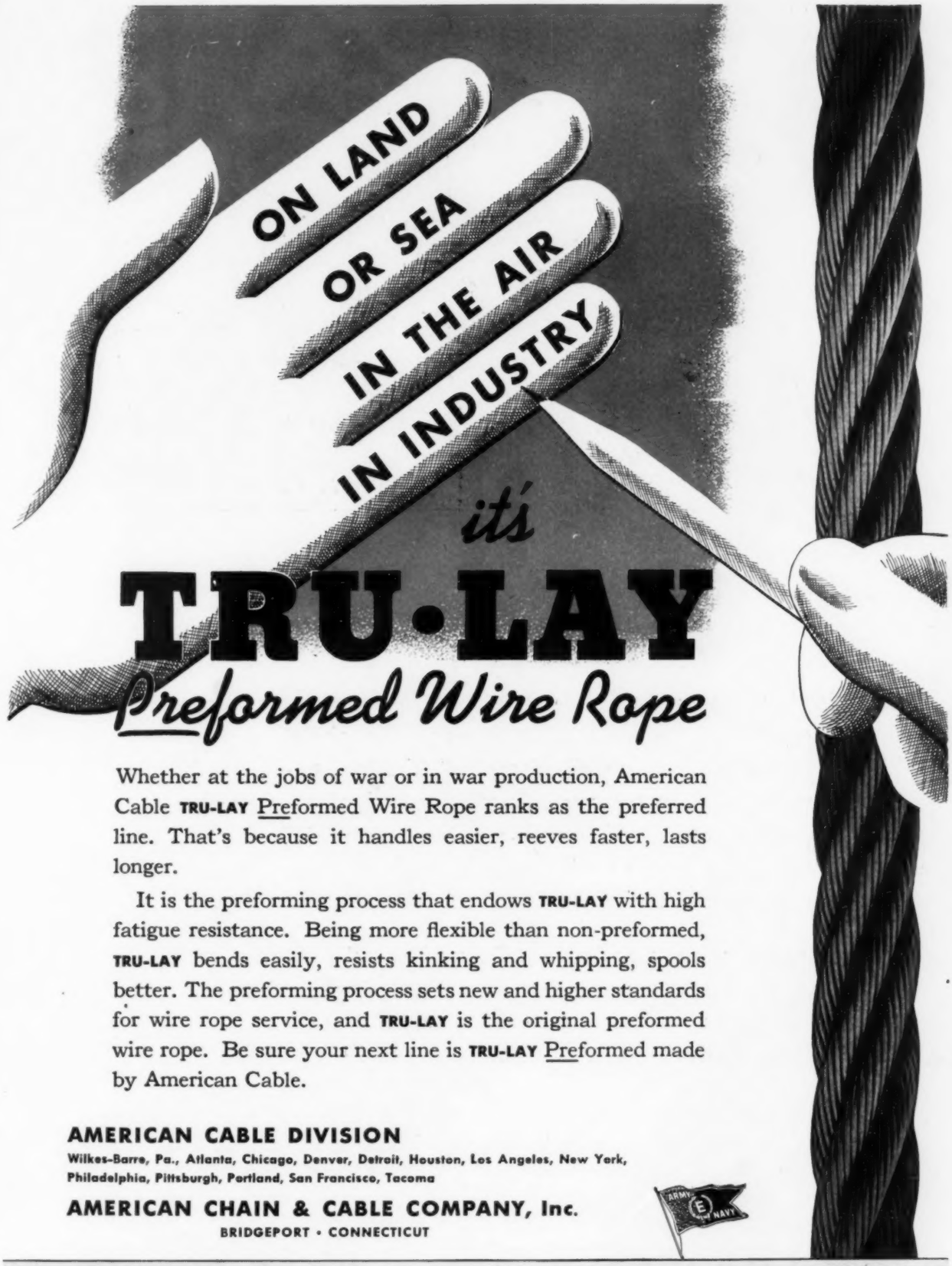
Templeton, Kenly & Co. 146
Texas Company, The 31
Thermoid Company 135
Thew Shovel Co., The 149
Timber Structures, Inc. 34
Timken-Detroit Axle Co., The 113
Timken Roller Bearing Co., The ..... 4th Cover
Trojan Powder Co. 129
Tyson Bearing Corp. 24

Union Fork & Hoe Co., The 138
Union Iron Works, Inc. 148
Union Metal Manufacturing Co., The 144
Union Steel Products Co. 104
United States Steel Corp., Subsidiaries 36, 46
Universal Atlas Cement Corp. 36
Upson-Walton Co., The 12

Viber Company 104
Vulcan Iron Works 84

Wellman Engineering Co. The 110
White Mfg. Co. 158
Whiteman Mfg. Co. 44
Wickwire Spencer Steel Co. 123
Williams & Co., J. H. 10
Winslow Sales Co. 93
Wood Manufacturing Co. 6
Wooldridge Manufacturing Co. 157
Worthington Pump & Machinery Corp. 95

..... 14
.....102
.....136
..... 19
.....145
.....122
.....125
..... 39
..... 5
.....141
..... 45
.....130
.....133
..... 94
.....138
.....132
104, 126
.....118
..... 47
.....134
..... 86
..... 33
.....130
..... 29
.....106
.....126
.....156
.....122
..... 30
.....114
..... 28
..... 95
.....132
.....137
.....107
.....158
.....147
.....114
..... 38
.....140
..... 23
.....112
.....139
.....108
.....158
.....142
.....130
.....146
..... 31
.....135
.....149
..... 34
.....113
Cover
.....129
..... 24
.....138
.....148
.....144
.....104
26, 46
.....36
..... 12
.....104
..... 84
.....110
.....158
..... 44
.....123
..... 10
..... 93
..... 6
.....157
..... 95



it's

TRU·LAY

Preformed Wire Rope

Whether at the jobs of war or in war production, American Cable **TRU-LAY** Preformed Wire Rope ranks as the preferred line. That's because it handles easier, reeves faster, lasts longer.

It is the preforming process that endows **TRU-LAY** with high fatigue resistance. Being more flexible than non-preformed, **TRU-LAY** bends easily, resists kinking and whipping, spools better. The preforming process sets new and higher standards for wire rope service, and **TRU-LAY** is the original preformed wire rope. Be sure your next line is **TRU-LAY** Preformed made by American Cable.

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT · CONNECTICUT

ARMY-NAVY (E)

ESSENTIAL PRODUCTS...TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, MANLEY Auto Service Equipment, MARYLAND Bolts and Nuts, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Steel Castings, WRIGHT Hoists, Cranes . . . *In Business for Your Safety*

YOU PICK THE ROCK-

We'll pick the Timken Bit to match it!

Four major factors are responsible for the outstanding success of the Timken Rock Bit: our superior method of attachment, with shock-taking shoulder; a bit for every kind of rock, each scientifically designed to do its special job with maximum effectiveness; our intimate knowledge of rock formations and rock drilling; nation-wide service facilities from 15 factory branches supplemented by a network of Authorized Distributors, conversion and re-conditioning shops, all strategically located for instant availability.

Important as the performance of the Timken Rock Bit is today, it will be even more important during the intensive years of reconstruction that lie ahead; then its ability to effect radical savings in time and cost will help users to operate profitably while meeting any competitive challenge.

That's why it will pay you to adopt Timken Bits *now*. May we have the privilege of discussing your rock drilling problems with you in the near future? The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS

FIGHT BY HIS SIDE